UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

PAPYRUS TECHNOLOGY CORP.,	:	
Plaintiff and Counterclaim-Defendant,	:	
v.	:	**Before: Judge Judith M. Barzilay***
	:	**No. 04 CV 00625**
NEW YORK STOCK EXCHANGE, LLC,	:	**PUBLIC Version**
Defendant and Counterclaim-Plaintiff.	:	

OPINION AND ORDER

* The Honorable Judith M. Barzilay, Judge, United States Court of International Trade, sitting by designation.

BARZILAY, JUDGE:

Before the court are four motions – one by Plaintiff Papyrus Technology Corp. ("Papyrus") and three by Defendant New York Stock Exchange, Inc. ("NYSE") – concerning U.S. Patent No. 5,774,877 (issued June 30, 1998) ("the '877 Patent") and U.S. Patent No. 5,797,002 (issued Aug. 18, 1998) ("the '002 Patent"). Papyrus moves for summary judgment of infringement by NYSE of the '002 Patent. In turn, NYSE moves for summary judgment of non-infringement of the '877 and '002 Patents. Also before the court are NYSE's motions for summary judgment that all asserted claims of the '877 Patent and the '002 Patent are obvious and therefore invalid. To hold a patent claim invalid, the evidence must be clear and convincing. After analysis of the voluminous record in this case, the court believes that there is clear,

convincing, and uncontroverted evidence that every claim in the patents at issue was either explicitly identified in the appropriate prior art or would have been obvious to a person of ordinary skill. The asserted claims are therefore invalid.[1] The court's reasoning follows.

I. Background

A. Procedural History

Papyrus first filed suit against NYSE in January 2004, alleging infringement of four patents – the '877 Patent, the '002 Patent, U.S. Patent No. 5,915,245 (issued June 22, 1999) ("the '245 Patent"), and U.S. Patent No. 6,539,362 B2 (issued Mar. 25, 2003) ("the '362 Patent"). In March 2004, NYSE denied Papyrus's allegations and counterclaimed for a judgment of invalidity, non-infringement, and unenforceability of the '877, '002, '245, and '362 Patents, as well as for a declaration that there had been no breach of contract. Papyrus filed a supplemental complaint in September 2004 alleging infringement of U.S. Patent No. 6,768,981 (issued July 27, 2004) ("the '981 Patent"). Following the conclusion of fact discovery in January 2005 and expert discovery in March 2005, the parties stipulated to the dismissal with prejudice of all claims relating to the '245 and '362 patents. *See* Stipulation and Order of Dismissal, *Papyrus Tech. Corp. v. N.Y. Stock Exch. Inc.*, No. 04 CV 00625 (S.D.N.Y. May 11, 2005) (No. 68). In response to NYSE's January 2005 request for a Markman hearing, the court ordered the parties to

[1] Because the court holds as a matter of law that the claims in the '877 and '002 Patent are invalid for obviousness, it need not address the issues of infringement. *See Ariad Pharm., Inc. v. Eli Lilly & Co.*, 560 F.3d 1366, 1380 (Fed. Cir. 2009); *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1368 (Fed. Cir. 2008).

brief the claim-construction issues, which they completed in May 2005.[2] Following the Markman hearing, the court issued a memorandum and order in September 2008, in which it construed fifteen disputed terms and phrases from the claims of the '877, '002, and '981 Patents. *See Papyrus Tech. Corp. v. New York Stock Exch., Inc.*, 581 F. Supp. 2d 502 (S.D.N.Y 2008) ("*Papyrus III*").[3] Four months later, as a result of the claim-construction rulings, Papyrus stipulated to a judgment of non-infringement with regard to the '981 Patent. See Stipulation and Order, *Papyrus Tech. Corp. v. N.Y. Stock Exch. Inc.*, No. 04 CV 00625 (S.D.N.Y. Dec. 3, 2008) (No. 127).

On January 15, 2009, Papyrus moved for summary judgment of infringement of the'002 Patent. NYSE concurrently moved for summary judgment, asserting that claims 1-11 and claims 14-19 of the '877 Patent are invalid. In addition to its other supporting documentation, Papyrus filed the Declaration of Lee A. Hollaar (the "Hollaar Declaration") as a supplemental report pursuant to Federal Rule of Civil Procedure 26(e). Although NYSE contested the admissibility of the report, the court ultimately admitted the *Declaration* into the record on March 17, 2009. *See Papyrus Technology Corp. v. New York Stock Exchange, LLC*, 257 F.R.D. 39 (S.D.N.Y.

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[2] After the untimely death of Judge Richard C. Casey in March 2007, the case was reassigned twice – first to Judge Sidney H. Stein in May 2007, and then to Judge Judith M. Barzilay in October 2007.

[3] The history of this case includes two opinions addressing procedural issues not relevant here. *See Papyrus Tech. Corp. v. New York Stock Exch., Inc.*, No. 04-CV-00625, 2005 WL 1606059 (S.D.N.Y. July 7, 2005) ("*Papyrus II*"); *Papyrus Tech. Corp. v. New York Stock Exch., Inc.*,325 F. Supp. 2d 270 (S.D.N.Y. 2004) ("*Papyrus I*").

2009) ("*Papyrus IV*"). After resolving the admissibility issue, the court issued a revised scheduling order on April 6, 2009 for summary judgment briefing. The court now turns to the substantive issues in the parties' respective summary judgment motions.

B. The Patents in Suit

1. The '877 Patent

The '877 Patent was filed on September 20, 1994, and issued on June 23, 1998. Generally, the '877 Patent teaches "[a] method of managing the activities of one or more floor brokers situated on the floor of an exchange" which uses "a programmed computer to compare a relative number of instructions having a pending status that have been delegated to the floor brokers and find the floor broker having comparatively few pending instructions." '877 Patent, Abstract. More specifically, Claim 1 recites that the patent is:

> 1. A method for managing one or more floor brokers situated on the floor of an exchange, comprising the steps of:
>
> providing each floor broker with a two-way communications device;
>
> transmitting an instruction from a programmed computer operated by an operator to the two-way communications device provided to a floor broker, the instruction being selected from the group consisting of quotations requests, quotations, orders, partial executions, and executions;
>
> transmitting from each two-way communication device to the programmed computer current-status information concerning any transmitting instructions;
>
> calculating at the programmed computer a remaining quantity of unfilled orders to fill using current-status information transmitted to the programmed computer;
>
> automatically and simultaneously displaying at the programmed computer in real time the current status information of at least a portion of the delegated instructions received from each two-way communication device; and

selecting a floor broker to whom a further instruction is to be transmitted.

'877 Patent col.32 ll.25-47.

2. The '002 Patent

The '002 Patent, which was filed on June 7, 1995 and issued on August 18, 1998, enables an operator to delegate instructions to floor brokers based on current-status information automatically displayed at the operator's computer, and discloses a data structure for use in a two-way wireless system for processing trades. *See* '877 Patent, Abstract; '002 Patent, Abstract. Independent Claim 1 of the '002 Patent recites:

> 1. In a system for processing one or more executions against an order, a local computer-readable memory for storing data for access by an application program being executed on a two-way wireless system, comprising:
> a data structure stored in said local computer-readable memory, said data structure including information used by said application program and including:
> a plurality of data packets stored in said local computer-readable memory, each of said data packets containing said information and further containing a sequence code and a volley code, said sequence code associating a subset of said plurality of data packets together and said volley code defining a hierarchical relationship among said subset of data packets;
> an order data packet being one of said subset of data packets and having one hierarchical level;
> at least one execution data packet being another of said subset of data packets and having another hierarchical level, said at least one execution data packet having a many-to-one relationship with said order data packet, each of said at least one execution data packet being defined by a uniquely assigned execution sequence number, said execution sequence number being assigned by said application program.

'002 Patent col.33 ll.26-48. Furthermore, Claim 8 of the '002 Patent explains that the invention is:

8. A two-way wireless system for processing one or more executions against an order, comprising:

a first computer running a first application program that generates sequence codes and volley codes, said volley codes being related to the stage of processing of the order, said first computer having a computer-readable memory for storing data;

a second computer running a second application program that generates volley codes, said second computer having a computer-readable memory for storing data;

a data structure stored in each of said computer-readable memories, said data structure including information which is accessible by each of said first and second application programs and including:

a plurality of data packets stored in said computer-readable memories, each of said data packets containing information and further containing a sequence code and a volley code, said sequence code associating a subset of said plurality of data packets together and said volley code defining a hierarchical relationship among said subset of data packets;

an order data packet being one of said subset of data packets and having one hierarchical level;

at least one execution data packet being another of said subset of data packets and having another hierarchical level, said at least one execution data packet having a many-to-one relationship with said order data packet; and

a wireless communications link between said first and second computers which is selectively established to enable transmission of said data packets therebetween.

'002 Patent col.34 ll.9-39.

C. Trading and Financial Markets

Among the various types of financial markets in existence is the auction market, which is the focus of the '877 and '002 Patents.[4] In a typical transaction, an investor places an order or quote request – an inquiry regarding the price and trading volume information for a particular

[4] Because they stem from the same initial patent application – Application Serial No. 08/309,337 – the '877 and '002 Patents share nearly identical specifications. Accordingly, where the text of the specifications is similar, the court will cite to the '877 Patent.

instrument – with an off-the-floor trading desk. '877 Patent col.1 l.66 to col.2 l.4; col.2 ll.17-19, 26-45. In turn, the trading desk conveys the order, either electronically or by telephone, to a booth clerk.[5] *Id.* col.2 ll.1-2. Having noted the parameters of the order, the booth clerk decides whether to delegate the order to a floor broker[6] or whether to send it electronically to a specialist[7] at a trading post. *Id.* col.1 l.30 to col.2 l.16. Once the floor broker or specialist has handled the delegated instruction, the booth clerk reports the execution or quote to the investor. *Id.* col.1 ll.58-59.

Traditionally, when a booth clerk decided to use a floor broker, the booth clerk transcribed instructions onto an order slip or quote request form and used a page or runner to carry instructions from the perimeter of the trading floor to the floor broker. *Id.* col.2 ll.61-67. After a floor broker executed an order or quote request, the broker would note the information onto paper slips and give them to the page for conveyance to the booth clerk. *Id.* col.2 l.66 to

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[5] The booth clerk "is not part of the trading crowd," but rather, "receives orders and quote requests from investors and relays them to one of the floor brokers for handling." *Id.* col.1 ll.55-58.

[6] The floor broker "roams about the trading floor, and, as an agent, transacts orders on behalf of the buyers and sellers." *Id.* col.1 ll.45-47.

[7] The patent specifications explain that the specialist has several roles, including:

> auctioneer to call out the best bids and offers to brokers that request quotes during the trading session and to ensure that all trades are posted; catalyst to call a particular broker who has previously expressed a buying interest to the post in response to a selling interest at the post; agent to represent investors in trades that have limits imposed thereon, for example, a price floor, etc.; and franchiser to provide capital when necessary to maintain liquidity when supply and demand are out of balance.

Id. col.1 ll.31-42.

col.3 l.5. Use of paper records for orders and executions could be problematic, however, as the paper slips could be misplaced, or dropped and lost among the discarded slips on the trading floor. *Id*. col.3 ll.20-27.

In an effort to make the auction market more efficient and effective, financial exchanges began automating various aspects of the marketplace. *Id.* col.3. ll.40-54. Exchanges also incorporated technological innovations, where appropriate. For example, booth clerks used beeper technology to alert the floor broker that an order had been received, whereupon the floor broker would leave the trading floor and use a "yellow phone" to contact the booth clerk and receive instructions. The floor broker would then transcribe the instructions relayed by the booth clerk and return to the trading floor. *Id*. col.4 ll.1-13. Later, cellular phone headsets were introduced to exchanges, allowing voice communications between the booth clerks and floor brokers. *Id*. col.4 ll.26-27. Member firms and exchanges also began using electronic systems which would allow for the electronic routing of orders to a trading post for matching and reporting. *Id.* col.1 ll.60-61.

In 1989, as the result of an investigation into illegal trading practices at the Chicago Board of Trade (the "CBOT") and at the Chicago Mercantile Exchange (the "CME"), the Federal Bureau of Investigation found instances of "dual trading and front-running whereby traders fill[ed] personal orders either simultaneously or ahead of their customers." Ellis Booker, *Handheld Auditing Eludes Chicago Commodity Traders*, COMPUTERWORLD, Sept. 12, 1994, at 1; Franks Decl. Ex. 153 at 1. As a result of the investigation, Congress passed the Futures Trading Practices Act of 1992 ("FTPA" or the "Act"), which mandated enhancements to audit trail

systems, and required that exchanges "provide a complete record of each trade that can be used for monitoring trading activity and enforcing customer protection and market integrity requirements." Commodity Futures Trading Commission, *Report to Congress on Futures Exchange*, Nov. 1994, at 3 ("*CFTC Report*"); Yeh Decl. Ex. 85 at 2-3.[8] The FTPA also required

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[8] NYSE asserts that this document is inadmissible hearsay and should therefore be stricken and disregarded. Def. '877 Invalidity Reply Br. 3. Federal Rule of Evidence 803(8) is the public records and reports exception to the hearsay rule, and allows "[r]ecords, reports, statements, or data compilations, in any form, of public offices or agencies, setting forth . . . (C) in civil actions . . . factual findings resulting from an investigation made pursuant to authority granted by law, unless the sources of information or other circumstances indicate lack of trustworthiness." Fed. R. Evid. 802, 803(8). The Commodity Futures Trading Commission (the "CFTC") wrote the document at issue to comply with the FTPA's requirement that it submit a report to Congress assessing the progress of exchanges in complying with the Act's mandate for enhancements to audit trail systems. Congress created the CFTC as an independent agency entrusted with "sweeping authority" to implement the Commodity Exchange Act (the "CEA"), an act that "broadly prohibits fraudulent and manipulative conduct in connection with commodity futures transactions." *Commodities Futures Trading Comm'n v. Schor*, 478 U.S. 833, 836 (1986). Here, the report contains the CFTC's own factual findings, as well as the Commission's own opinions and conclusions, on whether the various exchanges had met, or were then in the process of meeting, the statutory requirement of implementing enhancements to audit trail systems. The court finds that the report therefore meets the first requirement of Rule 803(8)(C), and must now assess whether the report satisfies the trustworthiness requirement.

To establish trustworthiness, the court "must determine [whether] the report contains factual findings based on a factual investigation" whose methodology "provides a threshold safeguard against unworthiness." *Ariza v. City of New York*, 139 F.3d 132, 134 (2d Cir. 1998) (citing *Beech Aircraft Corp. v. Rainey*, 488 U.S. 153, 169 (1988)). The CFTC explained in the report's methodology section that it evaluated information from numerous sources, including, but not limited to: interviews, documents, time schedules, contractual provisions and arrangements, budget allocations, exchange letters submitted in response to the Commission's requests for information, software logs, various system, user, and training manuals, and test and capacity plans. *CFTC Report* App. C at 1-3. The CFTC then analyzed this information to arrive at factual findings and develop conclusions on the state of audit trail enhancements in financial exchanges. "When evaluating the trustworthiness of a factual report, [the court looks] to [(1)] the timeliness of the investigation, [(2)] the special skills or experience of the official, [(3)] whether a hearing was held and the level at which it was conducted, and [(4)] possible motivation problems." *Bridgeway Corp. v. Citibank*, 201 F.3d 134, 143-144 (2d Cir. 2000) (citing Fed. R. Evid. 803(8)(C) advisory committee's note). In this case, nothing calls into question the reliability of the CFTC's report, which was prepared by an independent agency with

that the exchanges make a good faith effort to satisfy the enhanced audit trail requirements by October 28, 1995. *CFTC Report* at 19, 23. Although the Act "[did] not specify electronic means as the required method of compliance with the standards of independence, unalterability and sequencing," financial exchanges began utilizing two approaches – the "development of entirely new electronic audit trail systems, including handheld automated terminals and automated order routing systems," and the electronic and non-electronic improvement of existing audit trail systems. *Id.* at 23-24.

Even before the FTPA and the enhanced reporting requirements, financial exchanges engaged in the development of electronic, computer-based systems for use in trading. For

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authority to implement the CEA. That it was the result of "an ongoing review of each exchange's existing and developing audit trail systems" also suggests that the report was made in a timely manner. *CFTC Report* at 4 n.5. Finally, nothing in the report or in the record suggests that the CFTC would have any motive to misrepresent the status of the exchanges' compliance with the statutory requirement. The court therefore finds the CFTC's report admissible hearsay pursuant to the public records and reports exception of Rule 803(8)(C).

NSYE relies on *United States v. Banky-Alli*, No. 05-0589, 2005 U.S. App. LEXIS 25427, at *9 (2d Cir. 2005) and *Lewis v. Valdez*, 149 F.R.D. 474, 487 (S.D.N.Y. 1993) to argue the proposition that this Cout has refused to apply the Rule 803(8) exception "to documents that rely on statements by third parties that are themselves inadmissible hearsay." Def. '877 Invalidity Reply Br. 23. Based on its interpretation of these cases, NYSE contends that the report relies on inadmissible statements derived from, or contained in, CME letters to the CFTC, which are themselves hearsay because they contain statements being offered to prove the truth of the matter asserted, *i.e.* how CUBS operated. The court, however, is not persuaded by NYSE's argument. First, the court notes that it has within its discretion to admit documents that fall under Rule 803(8). *Paolitto v. John Brown E. & C., Inc.*, 151 F.3d 60, 64 (2d Cir. 1998). Second, the cases relied on by NYSE are inapposite to the controversy here. *Banky-Alli*, 2005 U.S. App. LEXIS 25427, at *9 (where the court affirmed the exclusion of a consular memorandum from a co-conspirator's asylum application that was not based on an independent investigation made by the Consulate, but rather, merely repeated the conclusions contained in a letter from a third party); *Lewis*,149 F.R.D. at 487 (where the court determined that a prison official's investigative report, which did not adequately evaluate or filter the incorporated hearsay statements from correction officers, was inadmissible in a civil rights action against correction officers).

example, the Chicago Board Options Exchange ("CBOE") began using a program called Order Routing System ("ORS") during the early 1980s. January Gaspar Decl. Ex. 18 ("Pfaffenbach Dep.") at 39-40.[9] ORS ran on the CBOE's mainframe computer, which consisted of a database that stored order and execution information. Def. '877 Statement of Material Facts ¶¶ 164-165 ("Def. '877 Facts").[10] By 1993, the CBOE's system included three components: Compass, a communications system going out to the member firms, ORS, in which firms could input orders electronically and route them to the exchange, and the Booth Entered Routing System ("BERS"), which consisted of a terminal attached to ORS that provided a template for transcribing orders coming in via phone. Pfaffenbach Dep. at 38-40; January Gaspar Decl. Ex. 21 at CB 1101-03. Once entered, ORS sent the order to a printer located on CBOE's trading floor, generating a "print ticket," which would be delivered to the floor broker. January Gaspar Decl. Ex. 21 at CB 1101; January Gaspar Decl. Ex. 19 at CB 0388; Franks Decl. Ex. 114 at 30. On May 25, 1994, CBOE's Public Automated Routing System ("PAR"), also known as the Universal Agency Workstation ("UAW"), debuted in live trading on the floor of the CBOE. Def. '877 Facts

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[9] On January 14, 2009, as part of its supporting documentation, NYSE submitted a declaration by Mr. Christopher Gaspar, Esq. with consecutively numbered exhibits. On May 15, 2009, NYSE submitted another declaration by Mr. Gaspar which includes documents with exhibit numbers identical to those in the January 2009 declaration. To distinguish between the two sources, the court will cite to the "January Gaspar Decl." and the "May Gaspar Decl."

[10] Where the court cites to NYSE's Statement of Facts, the court relies only on the information contained in those paragraphs which Papyrus did not challenge. The information contained therein is therefore deemed admitted for the purposes of summary judgment. S.D.N.Y. Civ. R. 56.1(c) ("*Each numbered paragraph in the statement of* material facts set forth in the statement required to be served by the moving party will be deemed to be admitted *for purposes of the motion* unless *specifically* controverted by *a correspondingly numbered paragraph in* the statement required to be served by the opposing party.")

¶¶ 175, 191. PAR allowed for the electronic delivery of order information to floor brokers in the pit and for the electronic delivery of fill information from the pit back to ORS and to the order originator. Def. '877 Facts ¶ 176.

In response to its 1988 objectives of (1) timely and accurate order flow and execution and (2) elimination of paper routing, the CME also developed its own electronic systems. Def. '877 Facts ¶¶ 154-156. As early as 1990, CME introduced its Trade Order Processing System ("TOPS") for order entry and reporting and used it in live trading on the exchange floor. January Gaspar Decl. Ex. 5 ("Linker Dep.") at 13; Franks Declaration Ex. 111 at CME 004039-40. In April 1992, the CME implemented the CME Universal Broker System ("CUBS"), which was a system for the electronic delivery of orders to a trader in the trading pit. *CFTC Report* at 48; Franks Decl. Ex. 111 at CME 004042. CUBS was comprised of three main elements, a CUBS booth station, a CUBS broker station, and a CME server. *CFTC Report* at 48. The CME implemented CUBS as a pilot program in April 1992 through the mid-1990s, *id.* at 49, eventually connecting the CUBS and TOPS systems via a hard-wired local area network. Linker Dep. at 18.

Concurrent to these efforts, in August 1989 the CME also created a joint venture with CBOT to develop a wireless, handheld system called the Automated Data Input Terminal ("AUDIT") that would record the time and details of each trade by a floor trader as it occurred. *CFTC Report* at 24; CME, *The Chicago Mercantile Exchange's Automated Systems*, Dec. 1989, at 10; Franks Decl. Ex. 111 at CME 004044. During its development throughout the 1990s, AUDIT was never connected with any order entry or delivery system at CBOT or CME, and no orders were routed to AUDIT either by CBOT or CME. Franks Decl. Ex. 87 ("Huff Dep.") at

122; May Gaspar Decl. Ex. 12 ("Taylor Dep.") at 179; Franks Decl. Ex. 88 ("Schultz Dep.") at 146; Franks Decl. Ex. 94 at NYSE 0068697. However, AUDIT handheld terminals were capable of transmitting trades from "locals" – traders making trades from their own accounts or accounts for which they have discretion, rather than executing customer orders – and sending them wirelessly to a base station.[11] Franks Decl. Ex. 131 at CME 003564; *CFTC Report* App. D at 20-21; Taylor Dep. at 37, 94-95. In April 1994, the AUDIT committee informed the CFTC that the "October 1995 statutory deadline for implementation of AUDIT was optimistic and probably would not be met." *CFTC Report* App. D at 13. Ultimately, the CBOT and the CME were unable to add order-handling features to the AUDIT handheld because the technology in existence at the time was not capable of sending and receiving information quickly enough to meet the real time demands of the exchanges. Linker Dep. at 222-223.

II. Legal Standards

A. Summary Judgment

Summary judgment is appropriate when "the discovery and disclosure materials on file, and any affidavits show that there is no genuine issue as to any material fact and that the movant

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[11] More specifically, in June 1994, AUDIT could handle CTI 1 trades, but not CTI 2, 3, or 4 trades. Franks Decl. Ex. 131 at CME 003564. The *CFTC Report* explains not only that "CTI" is a numerical code that is used to identify the source of a trade, but also that

> CTI 1 designates a trade by a member for his personal account or an account for which he has discretion; CTI 2 designates a trade for his clearing member's house account; CTI 3 designates a trade for another member present on the floor, or an account controlled by such other member; and CTI 4 designates a trade for any other type of customer.

CFTC Report at 27 n.42.

is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(c). A fact is "material" if it "might affect the outcome of the suit under the governing law . . . ." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). In that vein, "the mere existence of some alleged factual dispute between the parties will not defeat an otherwise properly supported motion for summary judgment; the requirement is that there be no genuine issue of material fact." *Anderson*, 477 U.S. at 247-48 (emphases omitted).

The party seeking summary judgment bears the initial burden of making a *prima facie* showing that no genuine issues as to the material facts exist for trial. *See id.*, at 247-48; *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). However, the non-movant may only defeat summary judgment by establishing, with the use of specific facts, that there is a genuine issue for trial. *See* Fed. R. Civ. P. 56(e); *Wright v. Coughlin*, 132 F.3d 133, 137-38 (2d Cir. 1998). To do so, the party opposing summary judgment must present more than a "scintilla of evidence," *Delaware & Hudson Ry. Co. v. Consol. Rail Corp.*, 902 F.2d 174, 178 (2d Cir. 1990) (quoting *Anderson*, 477 U.S. at 252), and cannot rely on the allegations in the pleadings, conclusory statements, or on "mere assertions that affidavits supporting the motion are not credible." *Gottlieb v. County of Orange*, 84 F.3d 511, 518 (2d Cir. 1996) (citations omitted). In making its determination whether to grant summary judgment, "the court is to resolve all ambiguities and draw all permissible factual inferences in favor of the party against whom summary judgment is sought." *Patterson v. County of Oneida, N.Y.*, 375 F.3d 206, 219 (2d Cir. 2004).

B. Invalidity

For an invention to be patentable, it must meet three requirements: utility, novelty, and nonobviousness. 35 U.S.C. §§ 101-103; *see Aristocrat Techs. Australia PTY Ltd. v. Intern. Game Tech.*, 543 F.3d 657, 661 (Fed. Cir. 2008). Once a patent issues, it is thereafter presumed valid. 35 U.S.C. § 282. To overcome this presumption of validity, "the party challenging a patent must prove facts supporting a determination of invalidity by clear and convincing evidence." *Schumer v. Lab. Computer Sys., Inc.*, 308 F.3d 1304, 1315 (Fed. Cir. 2002) (citation omitted). For evidence to be clear and convincing, it must give the finder of fact "an abiding conviction that the truth of [the proponent's] factual contentions [is] 'highly probable.'" *In re Omeprazole Patent Lit.*, 490 F. Supp. 2d 381, 500 (S.D.N.Y. 2007) (quoting *Colorado v. New Mexico*, 467 U.S. 310, 316 (1984)).

A patent claim may be held invalid if it is anticipated or made obvious by prior art. *See e.g.*, *Leggett & Platt, Inc. v. VUTEk, Inc.*, 537 F.3d 1349 (Fed. Cir. 2008) (affirming the district court's grant of summary judgment of invalidity based on a finding that the claimed patent was anticipated by prior art); *Ritchie v. Vast Resources, Inc.*, 563 F.3d 1334 (Fed. Cir. 2009) (finding that the patented invention was invalid for obviousness). A patent claim is invalid if it is anticipated by prior art that is "known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent" or "patented or described in a printed publication in this or a foreign country or in

public use or on sale in this country, more than one year prior to the date of the application for patent in the United States."[12] § 102(a)-(b).

A patent may be invalid due to obviousness if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." § 103(a). Whether a patent is obvious "is a question of law premised on underlying findings of fact." *Eolas Techs. Inc. v. Microsoft Corp.*, 399 F.3d 1325, 1332 (Fed. Cir. 2005) (citation omitted). Under § 103, the court considers factors such as (1) the scope and content of the prior art, (2) the differences between the prior art and the claims, and (3) the level of ordinary skill in the pertinent art. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) ("*KSR*") (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18). The court may also consider secondary considerations such as commercial success, long felt but unsolved needs, and the failure of others, so as "to give light to the circumstances surrounding the origin of the subject matter sought to be patented." *KSR*, 550 U.S. at 406 (citations omitted). Crucially, the relevant question "is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art." *Id.* at 420.

A patent "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.* at 418. However, the mere "combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 416. It is widely understood that

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[12] There is no claim of anticipation at issue here.

"[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one." *Id.* at 417. Where a person of ordinary skill can implement a predictable variation of a technique available in the same field of endeavor or a different one, § 103 will likely bar patentability of the variation. *Id.* However, in cases where the prior art "teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious." *Id.* at 416 (citing *United States v. Adams*, 383 U.S. 39, 51-52 (1966)).

To determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue, it may be necessary for a court to examine the "interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art . . . ." *Id.* at 418. In so doing, a factfinder "should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning." *Id.* at 421.

The Federal Circuit's "teaching, suggestion, and motivation" ("TSM") test "prevents hindsight and focuses on evidence before the time of invention . . . ." *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1260 (Fed. Cir. 2007). "The TSM test, flexibly applied, [ ]assures that the obviousness test proceeds on the basis of evidence – teachings, suggestions (a tellingly broad term), or motivations (an equally broad term) – that arise before the time of invention as the statute requires." *Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1365 (Fed. Cir. 2008). The court "need not seek out precise teachings directed to the specific subject matter

of the challenged claim," but rather, "can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR*, 550 U.S. at 418; *see also Ortho-McNeil Pharm., Inc*., 520 F.3d at 1365.

III. Discussion

In moving for summary judgment of invalidity, NYSE argues that claims in the '877 and '002 Patents are unpatentable due to obviousness, *i.e.*, that it then would have been obvious to a person of ordinary skill in the 1993-95 time frame to combine and/or modify the prior art and create a technique or device similar to those taught in the patents at issue. Def. '877 Invalidity Br. 17-18; Def. '002 Invalidity Br. 14-15. Specifically, NYSE argues that the '877 Patent is obvious in view of the cited prior art, the CME and CBOE systems, and the prior art admitted in the '877 Patent's background section. Def. '877 Invalidity Br. 18-27. NYSE also asserts that the primary evidence of obviousness is sufficient to outweigh any secondary considerations and that the presumption of validity is easily overcome. Def. '877 Invalidity Br. 27-30. With regard to the '002 Patent, NYSE contends that (1) the CME's system constitutes prior art under § 102, (2) the evidence demonstrates the indisputability of the scope and content of the prior art as well as the differences between the claims and the prior art, (3) the secondary considerations further demonstrate the obviousness of the'002 Patent, and (4) the presumption of validity is easily overcome. Def. '002 Invalidity Br. 14-27.

Papyrus opposes both of NYSE's motions, arguing that material issues of fact preclude summary judgment. Regarding the '877 Patent, Papyrus contends that the CME and CBOE systems, as well as the prior art cited during prosecution does not render Claims 1, 2, 16, and 17

obvious. Pl. '877 Invalidity Resp. Br. 22-58. Papyrus also alleges that the secondary indicia of nonobviousness demonstrate the validity of the Claims. Pl. '877 Invalidity Resp. Br. 58-62. Addressing the '002 Patent, Papyrus asserts that the CME's system, or a combination of the CME and CBOE systems, does not render the Claims obvious, and that the secondary indicia of nonobviousness demonstrate the validity of the Claims. Pl. '002 Invalidity Resp. Br. 8-60.

A. Level of Ordinary Skill in the Pertinent Art Resolved

When conducting the obviousness analysis, the court "should look to common sense and 'take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *In re Omeprazole Patent Lit.*, 490 F. Supp. 2d at 515-16 (quoting *KSR*, 550 U.S. at 418). Accordingly, the court begins here by determining the level of ordinary skill in the pertinent art. To determine ordinary skill, the court may consider the following factors: "(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." *Daiichi Sankyo Co., Ltd. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007) (citation omitted); *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 666-67 (Fed. Cir. 2000). Further, the court presumes that the hypothetical person of ordinary skill in the art is aware of (1) all prior art in the same or analogous fields, and (2) "elements of prior art that were designed to solve problems other than those faced by the patent inventor . . . ." *In re Omeprazole Patent Lit.*, 490 F. Supp.2d at 516 (citing *KSR*, 550 U.S. at 420).

Although the patents at issue teach distinct methods and inventions, there is some undeniable overlap between the two patents. First, both patents involve the use of programmed computers and a two-way wireless communication system. Second, said network of computers is intended for use by floor brokers receiving orders and executing trades on the floor of a financial exchange. Third, the patents share identical background sections, nearly identical specifications, and much of the same prior art. In light of these considerations, the court need only establish a single definition for a person of ordinary skill for both patents: a person with (1) knowledge of negotiable instruments traded on auction markets,[13] (2) a bachelor's degree in electrical engineering or computer science, and (3) approximately one to two years of practical experience with computers and computer networks.[14] Since the parties have no dispute here, the court adopts these criteria for a person of ordinary skill in the art for purposes of this case.

B. Scope and Content of Prior Art

The scope and content of prior art includes that art which is "reasonably pertinent to the particular problem with which the inventor was involved." *Ruiz*, 234 F.3d at 664 (citation omitted). Crucially, prior art "'encompasses not only the field of the inventor's endeavor but also any analogous arts.'" *Medinol Ltd. v. Guidant Corp.*, 412 F. Supp. 2d 301, 313 n.81

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[13] In the auction market, "buyers and sellers congregate on the exchange floor and announce their respective bid (price offered to buy) and ask (price acceptable to sell) prices." '877 Patent col.1 ll.15-18.

[14] This definition is based in large part on the unrebutted definition offered by Papyrus's expert, Dr. Anthony Acampora, which NYSE accepts for purposes of summary judgment. Expert Report of Anthony Acampora, Ph.D., Franks Decl. Ex. 130 at ¶ 16 ("Acampora Report"); Def. '002 Invalidity Br. 14-15; Def. '002 Statement of Material Facts ("Def. '002 Facts") ¶ 187.

(S.D.N.Y. 2005) (quoting *In re GPAC Inc.*, 57 F.3d 1573, 1577-78 (Fed. Cir. 1995)). "To ascertain the scope of the prior art, a court examines the field of the inventor's endeavor, and the particular problem with which the inventor was involved, at the time the invention was made." *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 881 (Fed. Cir. 1998) (internal citations and quotations omitted). Section 102 also guides the court's inquiry, indicating that prior art also includes "[(1)] printed publications or patents from anywhere in the world published or issued before the date of invention; [(2)] a United States patent application subsequently issued, and filed before the date of invention; and [(3)] another's invention that was made in this country and not abandoned, suppressed, or concealed before the invention date of the invention in question." *Medinol Ltd.*, 412 F. Supp. 2d at 313 (citing § 102).

1. Prior Art Patents

As indicated by the text of the '877 and '002 Patents, the prior art includes forty-five unique prior art patents – forty-three domestic and two foreign. '877 Patent References Cited; '002 Patent References Cited; *see Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1570 (Fed. Cir. 1988) ("A statement in a patent that something is in the prior art is binding on the applicant and patentee for determinations of anticipation and obviousness.") (citation omitted). The court confines its discussion to the three patents most relevant here. First, U.S. Patent No. 5,297,031 (issued Mar. 22, 1994) ("Gutterman"), which the specifications refer to by name. Gutterman teaches a broker workstation for managing orders in financial exchanges and a method comprised of "selectively displaying order information incoming to the workstation;

accepting or rejecting orders corresponding to the incoming order information displayed; displaying accepted order information in a representation of a broker deck; and selectively displaying a total of orders at the market price." Gutterman Abstract.

Second, U.S. Patent No. 5,467,268 (issued Nov. 14, 1995) ("Sisley"), which Papyrus and the patent examiner discussed throughout the prosecution history of the '877 Patent.[15] *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005) (the prosecution history "includes the prior art cited during the examination of the patent" and demonstrates how the inventor and the PTO understood the meaning of the patent at the time of the proceedings). Sisley teaches "[a] system and method for assigning and scheduling resource requests to resource providers [that] use a modified 'best-first' search technique that combines optimization, artificial intelligence, and constraint-processing to arrive at near-optimal assignment and scheduling solutions." Sisley Abstract. Further, the invention "improv[es] the timeliness and predictability of resource delivery, increase[s] dispatcher productivity . . . by reducing travel time and generally improving utilization of active time, and enhance[s] flexibility by supporting a variety of organizational policy options to better serve diverse resource domains." Sisley col.3 ll.52-58.

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[15] During prosecution of the '877 Patent, the PTO initially rejected Claims 1-5 as obvious in view of the Sisley patent. January Gaspar Decl. Ex. 2 at NYSE 0087325-34. Although Papyrus denied that Sisley constituted prior art, it nevertheless sought to distinguish Sisley from the claimed invention. *Id.* at NYSE 0087350-54. The PTO again rejected the claims as being unpatentable over Sisley. *Id.* at NYSE 0087363-66. After Papyrus met with the patent examiner and amended the language of the claim to include language teaching the automatic and simultaneous display of current status information, the PTO allowed the claims. *Id.* at NYSE 0087482-83, NYSE 0087487.

Third, U.S. Patent No. 5,003,473 (issued Aug. 6, 1991) ("Kramer"), which teaches a system where

> [a] central computer equipped with communications hardware and specially designed software receives transaction data from personal transaction stations operated by traders, sends back verification information to the traders, reconciles all trades, informs traders when an error occurs, generates complete records of all transactions, reports price and volume data to quote vendors, provides numerous reports which analyze trading activity to detect potential regulatory violations, creates a complete [real time] backup copy of all data, and provides intraday profit, loss, risk, and margin information to exchange and Futures Commission Merchant personnel.

Kramer Abstract. Papyrus relies on this patent to argue the validity of the '002 Patent, contending that because (1) the Kramer patent discloses the same functionality as the CME's hand held device ("AUDIT"), and (2) the patent examiner considered Kramer during the prosecution of the '002 Patent and deemed the claims allowable, the patent is valid over the CME's prior art. Pl. '002 Invalidity Resp. Br. 47. Although the prosecution contains no specific prior art patent references to Kramer by either the patent examiner or by Papyrus, the Kramer patent was part of the prior art cited in the application for the '002 Patent.[16]

2. Other Technologies

The prior art also includes those devices referred to in the background section of the patents, which details the problems with which the inventors were involved and the technology utilized in the field of the inventor's endeavor. At the time of the claimed invention, financial exchanges faced problems such as complying with the legal requirement that orders must be

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[16] Application 08/478,206, which became the '002 Patent, does not specifically cite the Kramer patent, but rather, incorporated it by reference, citing to the patents referred to in the parent application. May Gaspar Decl. Ex. 2 at NYSE 0087715.

handled in a timely manner, ensuring that instructions were accurately transcribed, and creating a clear audit trail of the orders and executions. '877 Patent col.3 ll.15, 55-56, col.4 ll.45-46. To meet these needs, at least in part, financial exchanges used technologies such as beepers, cellular phone headsets, and computer terminals (as disclosed by Gutterman). '877 Patent col.4 ll.1-65. In addition, the exchanges sought to phase-out the job of the runner by introducing hand-held computers to the trading floors. '877 Patent col.4 ll.66-67.

The court is also aware of the existence of multi-player game technologies, which permit (1) two or more people to play the same computer game via a network, and (2) players' screens to display information received from several other of the game's participants simultaneously and in real time. Because this technology was not addressed during discovery or briefing for summary judgment, the court afforded the parties the opportunity to address the issue of whether multi-player game technologies constitute prior art for the '877 Patent.[17] NYSE argues that the gaming technology is prior art either because there were patents published, or filed and subsequently published, before the date of invention. Specifically, NYSE points to two patents as examples of multi-player game technology. First, U.S. Patent No. 4,958,835 (issued, Sept. 25, 1990) ("Tashiro") teaches a "game playing system comprising a plurality of independent game machines" that are playable in either a single-player game or in

> a mul[ti]-player game with the other game machines in the same game space by the reception and transmission of data between one player's game machine and the other game machines through data transmission lines which connect said game machines together in a loop, each of said game machines comprising a

[17] The parties also discussed whether the '877 Patent is obvious in light of multi-player game technology. The court examines these arguments in Section III(C)(1)(a)(iii) of this opinion. *See infra* at 39.

> communication interface for performing the reception and transmission of data between the one player's game machine and the other game machines through said transmission lines . . . .

Tashiro col.2 ll.8-17. Second, NYSE cites to U.S. Patent No. 5,586,257 ("Pearlman"), which describes "an apparatus and method for linking multiple remote players of [real time] games" that utilizes a system comprised of various computers and a server coupled to the network.[18] Pearlman Abstract; *id.* col.4 ll.28-29. According to NYSE, Tashiro and Pearlman are examples of multi-player gaming technology which constitute prior art either because they share the same field of endeavor as the '877 Patent (networked computers and displays) or because they are analogous art. Def. Letter 1-2 (Aug. 7, 2009).

In contrast, Papyrus contends that multi-player game technology is not prior art because (1) it is "directed to a wholly different field of endeavor, *i.e.*, escapist entertainment where players compete with one another" rather than the handling of real-world financial transactions, (2) it is not reasonably pertinent to the particular problems to be solved, and (3) the examiner did not discuss or allude to any reference concerning said technology. Pl. Letter 2 (Aug. 7, 2009).

After considering the parties' respective positions, the court finds that multi-player game technology is prior art. Prior art includes any patents published or issued before the date of the claimed invention and any United States patent application filed before the date of invention and subsequently issued. § 102(e)(2). NYSE has presented the court with two examples of patents which meet this criteria. However, prior art must either fall within the same field of endeavor as the claimed patent or be reasonably pertinent to the particular needs and problems with which the

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[18] Pearlman was filed May 5, 1994 and subsequently issued on December 17, 1996, making it prior art under § 102(e).

inventor was involved. *Ruiz*, 234 F.3d at 664; *Medinol Ltd.*, 412 F. Supp. 2d at 313. In this case, multi-player game technology does not fall within the same field of endeavor as the '877 and '002 Patents, as the former allows multiple players to interact within the same computer game while the latter facilitate the timeliness and accuracy of financial trading. *See* '877 Patent Abstract. Nevertheless, the court finds that multi-player gaming constitutes prior art because it is reasonably pertinent to the problem addressed by the inventor of the claimed patent. *See In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007).[19] The Federal Circuit has explained that a "reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem." *Id*. at 1379-80. It is highly likely that a person of ordinary skill in the early 1990s would have known about the use of multi-player gaming technology and its ability to display information received from other users simultaneously and in real time. Further, it is also likely that a person of ordinary skill would have thought that said technology would be applicable to many computer interfaces including devices used for transmitting data on the floor of a financial exchange.

Based on the above considerations, the court therefore finds that beepers, cellular phone headsets, computer terminals, and multi-player video games are prior art.

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[19] The Federal Circuit found that although a patent teaching the use of a dual-action spring to facilitate the upright storage of a bed was from a different field of endeavor than that of the claimed invention – a treadmill with a folding base that required the use of a gas spring – it was nonetheless reasonably pertinent to the problem addressed by the claimed device and could therefore serve as analogous art. *See In re Icon Health & Fitness, Inc.*, 496 F.3d at 1379-80.

3. The CME and CBOE Systems

Less clear is whether other inventions should be joined with the aforementioned prior art. Here, NYSE argues that the CME and CBOE systems belong to the prior art of the '877 and '002 Patents under either § 102(a) or § 102(b). Def. '877 Invalidity Br. 16; Def. '002 Invalidity Br. 14. More particularly, NYSE alleges that the CME and CBOE systems were "known or used by others" and "in public use" under § 102 because they were used publicly and commercially in live trading before September 1993 and September 1994, respectively. Def. '877 Invalidity Br. 16; Def. '002 Invalidity Br. 14. Papyrus challenges the prior art status of the CME systems, alleging that TOPS and CUBS are not prior art because they were not connected as of September 1994 and therefore did not allow an operator to select a broker based on the automatic, simultaneous, and real time display of current status information. Pl. '877 Invalidity Resp. Br. 22-26.

Under § 102 prior art must be either "known" or "used," before the invention of the claimed patent,[20] or be in public use one year prior to the date of the claimed patent.[21] *See Clock*

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[20] Crucially, § 102(a) "requires only that the invention be *accessible to the public*, not that the public actually knew of or used the invention at issue." *Sys. Mgmt Arts Inc. v. Avesta Techs., Inc.*, 87 F. Supp. 2d 258, 263 (S.D.N.Y. 2000) (emphasis added).

[21] In addition to accessibility, the case law is clear that to invalidate a patent on the basis of anticipation the prior art must also be enabling. *See Impax Labs., Inc. v. Aventis Pharms, Inc.*, 545 F. 3d 1312, 1314 (Fed. Cir. 2008); *In re Omeprazole Patent Lit.*, 536 F.3d at 1373; *In Re Kumar*, 418 F.3d 1361, 1368 (Fed. Cir. 2005) (appeal of the U.S. Patent and Trademark Office rejection of an application); *Minnesota Min. & Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1301 (Fed. Cir. 2002); *Rockel Int'l. Corp. v. United States*, 147 F.3d 1358, 1365 (Fed. Cir. 1998); *Beckman Instruments, Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551 (Fed. Cir. 1989). The law is less clear, however, that enablement is required when *obviousness* is the basis for invalidity. *See Boeing Co. v. United States*, 69 Fed. Cl. 397, 420 (Fed. Cl. 2006) ("With respect to prior art . . . a non-enabling reference may qualify as prior art for the purpose of determining obviousness

Spring, L.P. v. Wrapmaster, Inc., 560 F.3d 1317, 1325 (Fed. Cir. 2009); *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1305 (Fed. Cir. 2006) ("Art that is not accessible to the public is generally not recognized as prior art."); *Minnesota Min. & Mfg. Co.*, 303 F.3d at 1301. In determining whether an invention was in public use, a court must consider factors such as policies underlying the public use bar, the removal of freely available inventions from the public domain which the public justifiably believes are freely available, the nature of the activity that occurred in public, public access to and knowledge of the public use, and whether observers were under a confidentiality obligation. *Bernhardt, L.L.C. v. Collezione Europa USA, Inc.*, 386 F.3d 1371, 1379 (Fed. Cir. 2004).

In this case, the record makes clear that the public had access to the trading floors of the CME, the CBOT, and the CBOE. In August 1993, personnel, members, firm personnel, and

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under § 103." (citing *Symbol Techs., Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1578 (Fed. Cir. 1991))); *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1357 (Fed. Cir. 2003) ("Under § 103, however, a reference need not be enabled; it qualifies as prior art, regardless, for whatever is disclosed therein."); *Chem. Separation Tech., Inc. v. United Staes*, 51 Fed. Cl. 771, 794 (Fed. Cl. 2002) (citing *Symbol Techs., Inc.*, 935 F.2d at 1578); Manual of Patent Examining Procedure ("MPEP") § 2121.01 ("'Even if a reference discloses an inoperative device, it is prior art for all that it teaches.' [*Beckman Instruments*, 892 F.2d at 1551.] Therefore, 'a non-enabling reference may qualify as prior art for the purpose of determining obviousness under [§ 103.' *Symbol Techs. Inc.*, 935 F.2d at 1578]."). The court notes that all but one of the cited cases precede *KSR*, the Supreme Court's seminal case discussing summary judgment based on invalidity for obviousness under § 103, which seems to eliminate or strictly limit any enablement requirement in the context of obviousness based on the combination of elements from several pieces of prior art. *KSR*, 550 U.S. at 418. The obviousness "analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* Because the issue in the present controversy is whether the '877 and '002 Patents were invalid due to obviousness and requires the court to consider combining elements in the prior art, the court finds it unnecessary to address enablement to determine whether the CME, CBOT, and CBOE systems were prior art.

members' clerks were allowed onto the CME's trading floor. Def. '877 Facts ¶¶ 157-158. In addition, the general public could either view the trading floor from a visitor's gallery or could access the trading floor itself as a guest of a CME member or a firm's personnel. Def. '877 Facts ¶¶ 159, 161. Once on the floor, visitors could see the various electronic trading devices being used by traders and "were in plain view of anyone who wanted to look at them on the floor." May Gaspar Decl. Ex. 18 ("Knighton Dep.") at 50-51. Indeed, "there were many people who were not traders who came across the floor at the time who could have seen [the electronic trading] instruments and could have looked at the[ ] screens."[22] *Id*. at 51. Moreover, if asked about the devices they were using, traders would demonstrate the use of the device. *Id.* at 51-52. Regardless of how the general public wished to view the CME trading floor, they were not asked to sign confidentiality agreements before being allowed into the visitors' viewing gallery or onto the trading floor. Def. '877 Facts ¶ 160; Linker Dep. at 54.

The CBOT and the CBOE had similar public access rules and procedures. For instance, CBOT members, clerks, and member firm personnel and staff had access to the trading floor in 1993 and could escort members of the general public – who were never asked to sign confidentiality agreements – onto the floor. Franks Decl. Ex. 147 ("Panek Dep.") at 61-62. At the CBOE, the public had nearly unrestricted access to the viewing gallery located one floor above the trading floor during the early 1990s. Def. '877 Facts ¶ 254; Pfaffenbach Dep. at 33. Additionally, members of the public could enter the trading floor if escorted by CBOE members

[22] Although the testimony of Mr. Mark Knighton focuses on the AUDIT handheld device and its presence on the trading floor, the same accessibility would necessarily apply to the other electronic trading devices on the floor of the CME, such as TOPS and CUBS.

or staff, and did not have to sign a confidentiality agreement in order to do so. Def. '877 Facts ¶ 259; Pfaffenbach Dep. at 35-36.

In light of evidence that the general public had access to the trading floors of the CME, CBOT, and CBOE, could see their respective systems in use, and could even receive demonstrations of their use from the traders, the court holds that TOPS, CUBS, AUDIT, ORS, and PAR are prior art as defined under § 102.

C. Differences Between the Claims and the Prior Art

1. The '877 Patent

According to NYSE, a person of ordinary skill in 1993-95 would have found the subject matter of Claim 1 of the '877 Patent to be obvious combinations or modifications of the prior art. Def. '877 Invalidity Br. 17. In contrast, Papyrus contends that because the prior art does not perform or suggest the key aspects of Claim 1 in the '877 Patent – the transmitting, calculating, displaying, and selecting steps – the claimed invention is not obvious. Pl. '877 Invalidity Resp. Br. 22-23, 27-42.

a. Independent Claim 1

i. The Transmitting Steps

The first two steps in Claim 1 of the '877 Patent address the transmission of instructions, explaining that the programmed computer sends instructions to the two-way device (first transmitting step) and that the two-way device transmits current-status information[23] concerning the instructions back to the programmed computer (second transmitting step). '877 Patent col.32

[23] The court construed "current status information" as "information indicating whether an instruction is pending or not pending." *Papyrus III*, 581 F. Supp. 2d at 541.

ll.29-37. Though Papyrus raises various collateral arguments regarding the second transmission step,[24] its primary contention is that the CME system was incapable of performing the second transmitting step because CUBS and TOPS were not connected until after the filing of the '877 Patent. Pl. '877 Invalidity Resp. 27. In so arguing, Papyrus relies on the information contained in the *CFTC Report*, which states that (1) CUBS ran as a pilot between April 1992 and the November 1994 publication of the report, (2) CUBS and TOPS did not communicate with each other during the pilot, and (3) the two systems would be connected only during a then-future phase of testing. *CFTC Report* at 49-50. Further, Papyrus stresses that the CFTC distinguished the CUBS booth station, which was connected to the CUBS broker station, from TOPS, which was not.[25]

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[24] For example, Papyrus alleges that the prior art in the background section does not suggest the transmitting of current status information. Pl. '877 Invalidity Resp. 42-43. While the court does not agree with the breadth of Papyrus's contention, it does note that telephone headsets and beepers are not two-way communication devices of the kind taught by the claimed patent. More particularly, beepers allow for communication in only one direction, that is, from the booth clerk to the floor broker, and do not allow for the broker to respond via the beeper itself. Headset telephones differ from the communication devices because they do not allow for the simultaneous transmission of current status information by numerous brokers, but rather, allow the clerk speak to only one broker at a time.

[25] The *CFTC report* describes CUBS as

> composed of three main elements: CUBS booth station, CUBS broker station, and CME server. The order flow begins when the clerk at the firm's booth receives an order. The clerks enters the details of the order into the CUBS booth station. The order is printed at the booth and, at the same time, the order is passed electronically to the broker station in the pit and appears on the broker's screen. The broker accepts or rejects the order. If accepted, the order is displayed in the "book window" . . . . Executed orders are removed from the book window and transferred to the scribe window for electronic endorsement . . . . CUBS captures the time that the broker sends the endorsement of the order back to the booth.

In turn, NYSE points to the deposition testimony of Mr. Brian Linker as evidence that CUBS and TOPS were connected in September 1993. When deposed, Mr. Linker repeatedly and explicitly stated that CUBS communicated with TOPS through the CME's local area network (LAN) before September 1993.[26] Linker Dep. at 15, 17-18. This LAN allegedly allowed the TOPS mainframe computer to send orders to a CUBS terminal in the pit and also allowed the CUBS terminal to send fill information to TOPS. *Id.* at 97-98, 143, 215-16, 251.

Because the transmission of current status information from the two-way device to the programmed computer is a key element of Claim 1, the existence of conflicting record evidence

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CFTC Report at 48-49.

[26] NYSE also points to a five-minute promotional video made by the CME as evidence that the CME had implemented live versions of both TOPS and CUBS by early 1993. *See* January Gaspar Decl. Ex. 7. Papyrus challenges the admissibility of the video, arguing that it is hearsay and does not fall within any exception. Pl. Response '877 Statement of Material Facts ¶ 136 ("Pl. '877 Facts"). NYSE relies on the Linker deposition to argue that the video qualifies under the hearsay exception Rule 803(6) because it was made by a person with knowledge, was kept in the course of regularly conducted business activity, and was the result of a regular practice of the NYSE. Def. '877 Invalidity Repl. Br. 17; Fed. R. Evid. 803(6) ("A memorandum, report, record, or data compilation, in any form, of acts, events, conditions, opinions, or diagnoses, made at or near the time by, or from information transmitted by, a person with knowledge, if kept in the course of a regularly conducted business activity, and if it was the regular practice of that business activity to make [said document], all as shown by the testimony of the custodian or other qualified witness . . . ."). In particular, Linker confirmed that the CME created the video and had knowledge of the trading systems used on the floor, kept the video in its records, and prepared promotional videos as part of its regular business activities. Linker Dep. at 201-203. The court, however, does not agree with NYSE that Linker's testimony establishes sufficient grounds to admit the testimony. Linker did not know when the CME created the promotional video. Indeed, it was only when prompted that was Linker able to give an approximate date. *Id.* at 200-01. The court also notes that the promotion video bears no clear time stamp establishing the date of creation. Although NYSE correctly notes that a computer screen shown during the video does include the date "10/15/92," the court is unable to determine whether the computer depicted is a TOPS or CUBS terminal. January Gaspar Decl. Ex. 7 at 20:09-20:12. In light of these considerations, the court finds that the CME promotion video is inadmissible hearsay. Fed. R. Evid. 803(6).

from seemingly reliable sources would generally induce the court to declare this an issue of material fact that precludes summary judgment. The court need not make such a conclusion, however. It is not necessary that the CME systems be connected and capable of transmitting current status information; instead, the *prior art* need only suggest such practice to a person of ordinary skill. Here, the record demonstrates that the CBOE systems were connected and performed transmitting functions like those in Claim 1. As early as May 1994, a wired LAN connected the PAR workstations, PAR server, and ORS, each of which had its own display screen. Def. '877 Facts ¶¶ 175, 193, 195; Acampora Report ¶ 22. The PAR system allowed electronic delivery of order information to floor brokers in the pit as well as electronic delivery of fill information from the pit back to ORS and the order originator. Def. '877 Facts ¶¶ 176, 194, 201. Based on the two-way transmission of messages between ORS and PAR, the court finds that there is little difference between the '877 Patent and the CBOE prior art and that it would therefore have been obvious to a person of ordinary skill to incorporate this capability into a system for managing floor broker trading.

ii. The Calculating Step

The third step of Claim 1 is the calculating step, which states: "calculating at the programmed computer a remaining quantity of unfilled orders to fill using current-status information transmitted to the programmed computer . . . ." '877 Patent col.32 ll.38-40. The court construed the step as meaning "mathematically processing the current-status information to expressly determine a number of unfilled orders to be completed." *Papyrus III*, 581 F. Supp. 2d at 541.

To differentiate the prior art from the '877 Patent, Papyrus again focuses on the CME systems, arguing that TOPS and CUBS do not show or suggest the calculating step. Papyrus cites no evidence to support its position, noting only that because orders were routed to the workstations according to the type of commodity or currency rather than broker workload, there would be no reason for the booth clerk to calculate the number of pending orders. Pl. '877 Invalidity Resp. 28-30. For its part, NYSE admits that the CME system did not calculate the exact number of unfilled orders to be completed using current-status information transmitted from the floor broker's computer to the booth computer. Def. '877 Invalidity Br. 20.

Even assuming that TOPS and CUBS were not connected prior to September 1994, the record contains evidence demonstrating that TOPS had the capability of searching through order and fill information entered via a TOPS terminal. More specifically, the TOPS Open Order Display Screen allows a user to search open orders by account number, originating station, order number (consisting of a terminal ID and sequence code), and commodity code, among other criteria. Def. '877 Facts ¶ 88; January Gaspar Decl. Ex. 9 at CME 005112; Linker Decl. at 143-145. Employing the same search criteria, the TOPS Order History Display Screen allowed a user to view orders and those instructions related to the orders, such as fills or order changes. Franks Decl. Ex. 119 ("TOPS User Reference Manual (1993)") at CBOT 0327164-65; January Gaspar Decl. Ex. 9 at CME 005112. A user could conduct a search on either screen and determine the number of pending instructions falling within specific criteria. For example, a search by date would produce a list of all open orders, regardless of the terminal in which they were entered. A search conducted using the terminal ID portion of the order number would produce a list of those

instructions entered at a particular workstation that were still pending. That TOPS could conduct these inquiries and produce information on the number of pending instructions complies closely with the court's definition of "calculating." The device need not actively calculate the number of pending instructions and produce a numeric indicator, but rather, need only provide the user with sufficient information to arrive at said calculation.[27] Moreover, even if TOPS and CUBS were not connected, it would have been obvious to a person of ordinary skill to assign terminal ID numbers to each CUBS workstation added to the system, and equally obvious to allow TOPS to conduct open order and order history searches based on CUBS terminal IDs so as to allow a system user to determine the number of pending instructions at a specific CUBS workstation.

Regardless of the connectivity of TOPS and CUBS, the CBOE system was capable of calculating the number of unfilled orders. In addition to trading pit workstations, the CBOE system included the PAR server, which had its own touch-sensitive display screen. Def. '877 Facts ¶¶ 181-88, 193; Acampora Report ¶ 22. Among the screens shown by the PAR Server was the Workstation Control screen, which showed the number of active orders for each PAR workstation, as well as the CBOE-issued identity acronym of the floor broker logged into a particular workstation. Def. '877 Facts ¶¶ 181-189. Papyrus seeks to differentiate PAR from the method taught by the '877 Patent by noting that the control room staff, rather than booth clerks, used the Work Station Control screen, and by arguing that NYSE has provided no evidence to show exactly where in the system the calculation of active orders takes place. Pl. '877 Facts

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[27] In reaching its definition for the Calculating Step of the '877 Patent – "mathematically processing the current-status information to expressly determine a number of unfilled orders to be completed" – the court noted Papyrus's concession that the clerk can compare the relative number of pending instructions through visual observation. *Papyrus III*, 581 F. Supp. 2d at 520.

¶ 181; Pl. '877 Invalidity Resp. Br. 37. The court does not find this information material to the issue of whether the CBOE system was in fact performing in a capacity similar to that required by the calculating step. Although the calculation and display of unfilled orders may have taken place in locations different than those in the '877 Patent, the evidence clearly demonstrates that PAR was in fact able to perform said calculations. Accordingly, the court finds that the calculating step is present in the CBOE prior art and strongly suggests a system which would allow member firm personnel to view the number of unfilled orders.

iii. The Displaying Step

The displaying step is the fourth step of Claim 1 and states: "automatically and simultaneously displaying at the programmed computer in real time the current status information of at least a portion of the delegated instructions received from each two-way communication device . . . ." '877 Patent col.32 ll.41-45. The court defines the displaying step as "the current status information for one instruction and some current-status information for another instruction that *may* be simultaneously displayed." *Papyrus III*, 581 F. Supp. 2d at 523.

Both NYSE and Papyrus are in agreement that the programmed computer in the CME's system (TOPS) did not automatically display updated status information. Def. '877 Invalidity Br. 20, 22; Pl. '877 Invalidity Resp. 31. NYSE contends that because the CUBS broker computers installed in 1993 were able to automatically display information from the booth, it would have been obvious to update TOPS mainframe computer and terminals – which had not been updated since the 1980s – in a similar manner. Def. '877 Invalidity Br. 22-23. In contrast, Papyrus argues that TOPS could not have displayed current status information because it was not

connected to CUBS until after September 1994 and therefore could not receive such information. Pl. '877 Invalidity Resp. 30.

As with the transmitting steps, the contested connectivity of TOPS and CUBS creates an issue of fact that would normally preclude summary judgment. If the CME system components were not connected, then a booth clerk would enter the status command (for some types of orders), whereupon a status request form would print on the floor of the exchange and be delivered to the broker handling the order via runner. Once the broker had filled out the status request, the runner would return the slip to the booth clerk, who would enter the information into the TOPS terminal. Linker Dep. at 139-40. If, however, TOPS and CUBS were connected, then the CUBS terminal which had received the routed instruction would return an in-work message to the TOPS originating station, which would then print out a status ticket. *Id*. at 251-255. In the alternative, a broker could enter a view command, causing TOPS to both display the status of the order on the screen and print out a status ticket. *Id.* The record evidence therefore does not allow the court to determine, at the summary judgment stage, whether TOPS did or did not automatically and simultaneously display the current status of delegated instructions.

Regardless of the connectivity of the CME system, ORS and PAR both had the capability of displaying current status information. Using ORS, a clerk could use the order inquiry function available on the Individual Order Inquiry Screen to search for, and display, the order and fill information stored in the ORS database. Def. '877 Facts ¶¶ 165, 169, 173, 210-11; Pfaffenbach Dep. 47-48, 51-52, 81-82. The order inquiry function was not automatic, as a clerk had to input a specific search parameter to find the information related to a specific instruction. Def. '877 Facts

¶ 169; January Gaspar Decl. Ex. 21 at CB 1194. The court previously noted that an operator using the PAR server display could view the number of active orders assigned to, and accepted by, a clerk using a particular workstation. Def. '877 Facts ¶¶ 181-188. The system automatically updated the Workstation Control screen every thirty seconds or whenever the operator pressed a specific on-screen button. Def. '877 Facts ¶189. In light of these facts, the court finds that display of current status information by the CBOE system differed from the claimed patent in that it updated the display screen at thirty second intervals rather than in real time.

Furthermore, the court finds little difference between the prior art multi-player gaming technology and the displaying step of the '877 Patent. As explained *supra* in Section III(B)(2), the Tashiro and Pearlman patents both present inventions which allow networked computers to transmit data among themselves, with each individual computer displaying some of the information received from several other players simultaneously and in real time. The primary way in which Tashiro and Pearlman do differ from the method in the '877 Patent is in the magnitude of the network taught by the patent; the former teach webs or loops of interconnected computers, while the latter envisions a smaller network where several handheld devices are linked with a base station run by the booth clerk.[28]

Finally, the court finds little difference between the Sisley patent and Claim 1 of the '877 Patent. According to Papyrus, the "automatically and simultaneously displaying" feature of the displaying step is the key difference between the two patents. Indeed, Papyrus specifically cites

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[28] This difference is not material, however, because the volume of trading at a financial exchange necessarily requires a network capable of handling messages transmitted between a large number of base station computers and an even larger number of handheld devices.

the examiner's statement of allowance, which states that "[Claim1] has been amended to clearly recite the feature of 'automatically and simultaneously displaying' information in real time both on the floor broker's display and the booth operator display, features which were not apparent in the prior art of record." January Gaspar Decl. Ex. 2 at NYSE 0087486; *id.* at NYSE 0087372; Pl. '877 Invalidity Resp. Br. 34. That the examiner's language contains the terms "automatic and simultaneous" and "real time" does little to convince the court that Sisley and the claimed patent are significantly different. Although the examiner's reasoning and statements did not limit the claim's meaning during claim construction, they are nonetheless "highly relevant to the validity inquiry." *See Papyrus III*, 581 F. Supp. 2d at 522 (citing *TorPharm, Inc. v. Ranbaxy Pharm., Inc.*, 336 F.3d 1322, 1329 (Fed. Cir. 2003)). Here, the examiner's statements seem to indicate his belief that the "automatic and simultaneous" display of information on *both* the base station *and* the handheld device was the key feature which distinguished the '877 Patent from the prior art.

Based on this evidence, the court concludes that it would have been obvious to a person of ordinary skill to develop a device that automatically and simultaneously displayed some of the transmitted information received from other electronic devices. Indeed, a person of ordinary skill would likely find it logical to combine the real time display of information feature present in multi-player game technology with the CBOE's capability of automatically updating the display of current status information every thirty seconds.

iv. The Selecting Step

The fifth and final step of Claim 1 is the selecting step, which provides as follows: "automatically and simultaneously displaying at the programmed computer in real time the current status information of at least a portion of the delegated instructions received from each two-way communication device." '877 Patent col.32 ll.41-45. The court construed the selecting step as "the operator selects, based on the displayed current status information and number of unfilled orders calculated above using current status information, the identity of a floor broker to whom a further instruction is to be transmitted." *Papyrus III*, 581 F. Supp. 2d at 541.

Despite its admission that the CME system did not allow a booth clerk to select the identity of a broker to receive another instruction based on the calculating and displaying steps, NYSE argues that common sense, the background section of the '877 Patent, and the Sisley patent would each have provided a person of ordinary skill with sufficient guidance to modify the CME system and achieve the selecting step. Def. '877 Invalidity Br. 20, 23. More particularly, NYSE contends that "it is common sense for a manager to provide a new task to an employee who is least busy with current tasks" and that the Sisley patent "discloses computerized processes for selecting the appropriate person to receive new work." Def. '877 Invalidity Br. 23. Papyrus counters with several arguments, namely that (1) even if TOPS and CUBS were connected, the CME system did not provide the booth clerk with a means to select a broker, (2) the CBOE system likewise did not allow the booth clerk to select a broker, and (3) Sisley concerns a method that is fundamentally different from the method in Claim 1. Pl. '877 Invalidity Resp. 26, 32, 35, 40-41.

The record demonstrates that the CME system (assuming connectivity) and the CBOE system did not include features which would allow for selection of a broker to whom an order would be routed *in real time*. Instead, the two systems routed orders according to programmed, pre-determined tables or parameters that reflected the routing selections of the member firms. Linker Dep. at 65-66, 220; January Gaspar Decl. Ex. 19 at CB 0390; Pfaffenbach Dep. at 41-42, 70-71, 99-100. At the CME, member firms would generally not make changes to the routing instructions unless their floor operation changed significantly. Linker Dep. at 66-67. Nevertheless, TOPS did provide firms with a limited real time re-routing function which allowed orders to be routed from a jammed or unresponsive printer to another printer at the booth. *Id.* at 65-66. The primary difference, therefore, between the prior art and Claim 1 of the '877 Patent is that the latter improved the facility and rapidity with which a booth clerk could assign an order to a floor broker.

The evidence also indicates that the general practice of assigning work to the most appropriate worker was already a prevalent method in the early 1990s. Indeed, the record is replete with patents addressing the scheduling and dispatching arts.[29] The patent examiner made a similar observation during prosecution, noting that Claims 1-5 "are clearly directed to a

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[29] *See e.g.*, January Gaspar Decl. Ex. 2 at NYSE 0086959 (U.S. Patent No. 4,700,295 ("Katsof")); NYSE 0086968 (U.S. Patent No. 4,740,788 ("Konneker")); NYSE 0087010 (U.S. Patent No. 5,111,391 ("Fields")); NYSE 0087035 (U.S. Patent No. 5,265,006 ("Asthana")); NYSE 0087072 (U.S. Patent No. 5,369,570 ("Parad")); NYSE 0087112 (U.S. Patent No. 5,325,292 ("Crockett")); NYSE 0087162 (U.S. Patent No. 5,278,984 ("Batchelor")); NYSE 0087177 (U.S. Patent No. 5,311,423 ("P. Deborah Clark")); NYSE 0087270 (Sisley); NYSE 0087299 (U.S. Patent No. 5,559,878 ("Keys")).

common sense approach of finding someone with too much time on their hands and putting them to work," and that it

> would have been obvious to one of ordinary skill in the art at the time of the invention to track the amount of work which various employees were currently working on, and to delegate further assignments based on the findings of this tracking, thus spreading out the total amount of work among various employees and optimizing the total time which it would take for all the work assignments to be performed.

Id. at NYSE 0087367. Further, the examiner stated that

> it would have been obvious to apply the teachings of Sisley et al. to the field of brokerage exchanges since the problem is one of delegating tasks, a problem commonly found in the scheduling and dispatching arts, one would look to those arts for a readily available solution such that the available work would be distributed evenly and could cause as little inconvenience as possible to clients.

Id. at NYSE 0087363. The court agrees with the examiner's reasoning and finds that using the technique described in the claimed selecting step would have been obvious to one of ordinary skill. Here, the ultimate goal of the claimed method is to allow the booth clerk to make an appropriate choice when routing an order. Nonetheless, the technological limitations present during the early 1990s, coupled with design need and market pressure, resulted in an environment where there were "a finite number of identified, predictable solutions" which a person of ordinary skill would have good reason to pursue. *KSR*, 550 U.S. at 421; *cf. Ortho-McNeil Pharm., Inc.*, 520 F.3d at 1364.

Regarding the combination of elements, the court notes as follows. The record demonstrates that the prior art either performs or suggests each of the limitations of Claim 1 of the '877 Patent. The court is well aware, however, that this in itself is not enough to render the '877 Patent obvious. As the Supreme Court has noted, "a patent composed of several elements is

not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR*, 550 U.S. at 418. Indeed, it is widely acknowledged that "inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *Id.* at 418-419. Nevertheless, "a combination of familiar elements according to known methods is likely to be obvious when it does no more than *yield predictable results*." *Id*. at 416 (emphasis added). As part of the obviousness analysis, therefore, the court must not only compare the patent claims to the prior art, but must also "ask whether the improvement is *more than the predictable use* of prior art elements according to their established functions." *Id.* at 417 (emphasis added). In this case, a person of ordinary skill in the art would have found it obvious to combine prior art elements like those embodied in the CBOE system and the Sisley patent to develop a method like the one described in Claim 1 of the '877 Patent. Papyrus was not the first to require that a system perform functions like those in the transmitting, displaying and calculating steps. The CBOE system performed all those functions prior to the '877 Patent. Similarly, the scheduling and dispatching arts, as exemplified by the Sisley patent, were widely known and applied to numerous fields of endeavor, including those known to one of ordinary skill here. To use such well known techniques in a financial exchange, some of which already employed systems that transmitted orders and executions, yields no more than a predictable use or a predictable result that a person of ordinary skill would have foreseen. *See id*. at 416-17. Therefore, the court finds that Claim 1 is invalid for obviousness under § 103.

b. Dependent Claims 2-19

The '877 patent contains eighteen claims which depend on independent Claim 1. *See* '877 Patent col.32 l.48 to col.34 l.21. Each of these claims is presumed valid and separately evaluated for obviousness. 35 U.S.C. § 282 ("Each claim of a patent (whether in independent, dependent, or multiple dependent form) shall be presumed valid independently of the validity of other claims; dependent or multiple dependent claims shall be presumed valid even though dependent upon an invalid claim. . . . The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity."); *Rosco, Inc. v. Mirror Lite Co.*, 304 F.3d 1373, 1379-80 (Fed. Cir. 2002).

NYSE argues that the court must find Claims 2-11 and 14-19 – the dependent claims of the '877 Patent – invalid if it finds independent Claim 1 invalid. Def. '877 Invalidity Br. 17; Def. '877 Invalidity Reply 25-27. Further, NYSE points out that Papyrus' invalidity expert, Dr. Acampora, relied primarily on the limitations of the independent claim to support the validity of the dependent claims, providing separate information for only the "wireless" feature in Claims 2-4 and the "image" feature of Claims 16-17.[30] Def. '877 Invalidity Br. 24. NYSE appears to be correct that dependent claims fall with the independent claim unless they are presented and argued separately, although the cases cited are all in the appellate context.[31] In this case, Papyrus

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[30] With regard to Claims 4-11, 14, 15, 18, and 19, Dr. Acampora opined merely: "[A]t least because each of these claims incorporate all the limitations recited in [C]laim 1 for the reasons set forth above with respect to [C]laim 1[,] these claims are likewise not found in or suggested by the prior art." Acampora Report ¶ 70.

[31] *Sibia Neurosciences, Inc. v. Cadus Pharm. Corp.*, 225 F.3d 1349, 1359 (Fed. Cir. 2000) (where the court found that because the plaintiff failed to argue on appeal the validity of dependent claims separately from the validity of the independent claim, the dependent claims did

separately addressed the validity of only dependent Claims 2, 16, and 17 in its response brief. Therefore, considering the content of Papyrus' expert deposition testimony, the arguments in its brief and the relevant case law, the court need separately address the validity of Claims 2, 16 and 17.

i. Dependent Claims 2, 16, and 17

Dependent Claim 2 of the '877 Patent teaches that the method of communication in Claim 1 will be wireless. The court finds this dependent feature, combined with the elements in the independent claim, to be obvious for the following reasons. First, Papyrus admitted in the background section of the '877 Patent that the CME was already using a handheld instant trade matching terminal, AUDIT, prior to the September 1994 application date. Second, AUDIT is a wireless trading technology that qualifies as prior art under § 102(a) and *KSR*.[32] Third, the background section of the patent also explicitly mentions beepers and cellular telephones, which are also wireless devices and prior art. In addition, the "References Cited" section of the '877 Patent specifically refers to U.S. Patent No. 5,295,154 (issued Mar. 15, 1994) ("Meier"), which teaches

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not stand on their own and necessarily fell as a result of the independent claim's invalidity); *MEHL/Biophile Int'l Corp. v. Milgraum*, 192 F.3d 1362, 1367 (Fed. Cir. 1999) (where the court affirmed the district court's judgment of invalidity because the plaintiff did not separately argue the validity of the dependent claims); *Gardner v. TEC Sys., Inc.*, 725 F.2d 1338, 1350 (Fed. Cir. 1984) (where the court affirmed the invalidity of the dependent claims because the plaintiff did not argue the validity of three dependent claims apart from the validity of the independent claim and the court could not discern an independent basis for validity).

[32] *See supra* Section III(B)(3).

> [a]n apparatus and a method for routing data in a radio data communication system having one or more host computers, one or more intermediate base stations, and one or more RF terminals organizes the intermediate base stations into an optimal spanning-tree network to control the routing of data to and from the RF terminals and the host computer efficiently and dynamically.

January Gaspar Decl. Ex. 2 at NYSE 0087560. Papyrus argues that the wireless feature in Claim 2 is not obvious because AUDIT, cellular phones, and beepers did not perform the functions of Claim 1 in their particular use of wireless technology. This argument, however, directly relies on the alleged uniqueness and validity of the limitations in independent Claim 1 – which the court has already rejected – and therefore fails to convince the court that a person of ordinary skill in the art would not have been motivated to look to a wireless method as a logical and accepted means of accomplishing the tasks set forth in Claim 1.

The validity of Claim 16 (the inclusion of an image in the further instruction) and of Claim 17 (where the selecting step includes the transmission of an instruction containing an image) is a closer case. The parties neither proposed a definition of the word "image" nor asked the court to define the term during claim construction. It was not until NYSE filed its moving brief that it proposed that an image may be "an imitation or representation of a thing." Def. '877 Invalidity Br. 25; January Gaspar Decl. Ex. 46 at 5 (WEBSTER'S NEW WORLD COLLEGE DICTIONARY 673 (3d ed. 1997)). Based on this definition, NYSE then goes on to suggest that the transmission of mere computer data in the prior art would be the same as the transmission of an image, thereby rendering Claim 16 and 17 obvious. The court is not persuaded by this fanciful argument.

For its part, Papyrus offers several definitions of the term "image" which are more pertinent to the purposes of the invention described in the '877 Patent. Papyrus first argues that "image" means "the optical counterpart of an object produced by an optical device (as a lens or mirror) or an electronic device." Pl. '877 Invalidity Resp. 55; Franks Decl. Ex. 90 at 3 (WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 600 (1988)); Franks Decl. Ex. 91 at 3 (MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY TENTH EDITION 577 (2002)). Additionally, Papyrus proffered the definition "[a] stored description of a graphic picture, either as a set of brightness and color value of pixels or as a set of instructions for reproducing the picture." Pl. '877 Invalidity Resp. 55; Franks Decl. Ex. 92 at 3 (THE MICROSOFT PRESS COMPUTER DICTIONARY 245 (3d ed. 1977)).

More important than the definitions put forth by the parties is the definition suggested by the patent specification, which uses the term "image" to mean "the optical counterpart of a graphic picture." *See* '877 Patent col.8 ll.62-65, col.11 ll.2-4 ("an image box 338 on top displays the image of a quote or message that has been sent to the clerk"); *id.* Figure 1. As Papyrus correctly notes, the words of the specification should be used to define a disputed term. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication."). The court therefore finds Papyrus's definition more appropriate for the context here and in accordance with case law.

This, however, is not the end of the inquiry. The court must now determine whether combining elements present in the prior art so as to fill a need or problem known in the field of

endeavor at the time of the invention would have been obvious to a person of ordinary skill in the art. *KSR*, 550 U.S. at 420. The parties do not dispute that the AUDIT handheld device "uses limited handwriting recognition to allow brokers to enter trade information into a handheld terminal." '877 Patent col.4 l.66 to col.5 l.8-10. Therefore, the ability to enter handwritten messages into a system was definitely a feature of the prior art. The patent also identifies the various problems inherent in the trading process that existed during the early 1990's. These problems, some of which were the result of attempts to improve the traditional, paper-based method of transmitting instructions, included: the accuracy of transcribing and transmitting instructions; the difficulties of using beeper technology accurately and efficiently; and the potential confusion during the transmission of instructions using cellular telephones. '877 Patent col.3 ll.53-67, col.4 ll.20-25, 28-37. Considering that these problems were well recognized, the court believes that a person of ordinary skill in the art would have found it obvious to take the known technology and develop an invention that allowed for the entering of handwriting into one device and for the transmission of an image of the handwriting to a second device.[33]

ii. All Other Dependent Claims

With regard to the other dependent claims of the '877 Patent, NYSE filed as Appendix A to its moving brief a thorough guide to the dependent claims, providing cites to evidence in the record which allegedly demonstrate that the limitations of said claims would be obvious based on the prior art. Papyrus did not respond to this information, nor did it argue that any of these

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[33] This is true regardless of whether CUBS and TOPS were connected during the appropriate time frame, as the AUDIT handheld was capable of both transmitting CTI 1 trades to a base station and of using limited handwriting recognition to allow for the entry of trades. *See* discussion *supra* note 11; '877 Patent col.5 ll.8-11.

claims would be valid if the independent claim is invalid. Guided by this material and its independent analysis of the record in the case, the court sets out its determination on the remaining dependent claims as follows.

Claim 3 teaches a spread spectrum radio link that is a well known type of wireless communication link that was known to the field well before the date of the patent application. *See* MCGRAW-HILL ENCYCLOPEDIA OF ELECTRONICS AND COMPUTERS 847-49 (2d ed. 1988). Moreover, the CME's wireless communication link between the AUDIT handheld device and the base station also used a spread spectrum radio link. Def. '877 Facts ¶ 119; *see* January Gaspar Decl. Ex. 2 (the Meier Patent) at NYSE 0087560. The presence of such technology in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 3 would have been obvious to a person of ordinary skill and is therefore invalid.

Claim 4 describes a connectionless protocol (TCP/IP) that has been used in electronic communications, such as the Internet, since the 1980s.[34] Applying either of the parties' definitions, transmissions to and from the CBOE's PAR server were made using a connectionless protocol. Def. '877 Facts ¶ 234. The wireless link for the AUDIT handheld was also established

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[34] Although NYSE argues that the parties' respective definitions for the term "connectionless protocol" differ, neither NYSE nor Papyrus asked the court to construe the term. According to NYSE, Papyrus defines "connectionless protocol" as "a method or set of rules for transferring data where the two communication devices do not first establish a virtual circuit or connection." Def. '877 Invalidity Br. App. A at 8. In contrast, NYSE defines the term as "a communications protocol in which each packet of data is independent and contains complete address and control information." *Id.* As discussed *infra* in Section III(C)(1)(b)(ii), the difference in these definitions is not material for purposes of assessing invalidity on the basis of obviousness.

using a connectionless protocol. Def. '877 Facts ¶ 7. The presence of such technology in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 4 would have been obvious to a person of ordinary skill and is therefore invalid.

Claim 5 requires the additional step of routing a communication between the programmed computer and a network associated with the exchange. Such networks were in common use during the 1993-94 time period. Specifically, communications to and from TOPS were routed through the CME's network, and communications to and from ORS were routed through the CBOE's network. Def. '877 Facts ¶¶ 116, 234-236. The presence of such practices in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 5 would have been obvious to a person of ordinary skill and is therefore invalid.

Claim 6 states that the method in Claim 1 includes routing communications between the programmed computer and a computer remote from the exchange floor. Again, during the relevant time period, remotely-located computers regularly communicated with one another. For example, the TOPS system sent information to terminals located off the exchange floor and to a clearing computer located off the exchange floor. Def. '877 Facts ¶¶ 124-127. ORS also sent information to member firms and the Options Price Reporting Authority ("OPRA") at remote locations. Def. '877 Facts ¶¶ 167, 237. The presence of such practices in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 6 would have been obvious to a person of ordinary skill and is therefore invalid.

Claim 7 describes assigning a sequence number to the delegated instruction in Claim 1. A sequence number was used in TOPS and was assigned to each order. Linker Dep. at 70-74, 91-93, 144; May Gaspar Decl. Ex. 9 at CME 004209-10. Papyrus argues that this sequence number bears no relation to the sequence number further explained in Patent '002. The court disagrees for purposes of the invalidity analysis and notes that it is common in electronic and manual systems for one discrete item to be assigned a unique number to allow it to be tracked and identified. (For instance, each court case is assigned a docket number and each submission in the case is assigned a special number within that docket.) In addition, ORS assigned an order ID (*i.e.*, a sequence number) to each order. Def. '877 Facts ¶¶ 238-240. The presence of such practices in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 7 would have been obvious to a person of ordinary skill and is therefore invalid.

The court will discuss Claims 8 and 9 together. Claim 8 recites that the transmissions received from the two-way device in Claim 7 include a sequence number. Claim 9 in turn recites the additional step of creating an audit trial by associating transmissions received at the programmed computer in accordance with the sequence number. There is some evidence in the record to show that the TOPS/CUBS system was designed to include a sequence number and to use that number for creating an audit trail for a particular order. Def. '877 Facts ¶ 135; January Gaspar Decl. Ex. 9 at CME 005112; Linker Decl. at 72-74, 143-145. The court need not rely on a mere design feature to invalidate the features of these claims. As discussed previously, the court is unable to determine whether TOPS and CUBS were connected during the relevant time

period. However, there is no doubt that PAR did send the sequence number and all fill information back to ORS and that an audit trail could be created as shown in an on-line transaction log. Def. '877 Facts ¶¶ 238-244. The presence of such practices in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 8 and Claim 9 would have been obvious to a person of ordinary skill and are therefore invalid.

Claim 10 recites that the transmissions further include information relating to the time of transmission. The background of the '877 Patent states that "by law, orders must be handled in a timely manner." '877 Patent col.3 l.16. To prove that this requirement was followed, it would be obvious that any successful system would include time of transmission as an element of an audit trail. Indeed, the CUBS system featured time-stamped transmissions. January Gaspar Decl. 8 at CME 005316. Papyrus argues that the pamphlet explaining this is inadmissible hearsay, but the court disagrees, finding that deponent Linker laid a proper foundation for its admissibility under Rule 803(6). Linker Dep. at 34-39. In any event, ORS created an audit trail for particular orders "arranged in chronological sequence." Def. '877 Facts ¶ 244. The presence of such practices in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 10 would have been obvious to a person of ordinary skill and is therefore invalid.

Claim 11 adds to Claim 10 the additional step of creating an audit trail by associating transmissions received at the programmed computer in accordance with the sequence number. The background of the '877 Patent discloses that Gutterman "provides an electronic audit trail of

executed orders." '877 Patent col.4 ll.55. Thus, the necessity of an audit trail and one manner of providing it was clearly known at the time of application. At the CBOE, ORS created an audit trail for a particular order using a unique order identification number which includes a series of numbers indicating sequence. Def. '877 Facts ¶¶ 238-244. The TOPS terminals, through the use of the TOPS Order Display History Screen, January Gaspar Decl. Ex. 9 at CME 005112, and the TOPS Order Detail Display Screen, Franks Decl. Ex. 119 at CBOT 0327168-69, contained a mechanism that allowed a search for complete order information. These screens could have been searched using the TOPS system. As the court cannot view the programming code used to create this search feature, it does not know whether the sequence code method was used in TOPS. It seems logical, however, that one method for searching complete order information for audit purposes would have suggested another, such as the use of the sequence number to associate transmissions. The court thus finds that the prior art either explicitly identifies or obviously suggests the claim limitation in Claim 11 and that it adds nothing new to the independent claim.

Claims 12 and 13 will also be discussed together. Claim 12 provides that there be a back-up method for insuring successful communications by automatically using an alternative method (*e.g.*, the telephone or pager specified in Claim 13) when transmissions are not received at the programmed computer from the floor broker's two-way communication device after a predetermined period of time. Neither party addresses these two claims in its briefs. The court will not undertake its own search of this exhaustive record to find references to these claims. It is common sense for an important method of communication to require a back-up in case of system failure, and considering that pagers and telephones were already in common use in exchanges

during the relevant time period, the court finds the presence of such practices in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor. Thus, Claims12 and 13 would have been obvious to a person of ordinary skill and are therefore invalid.

Claim 14 adds to Claim 1 the additional step of providing the pre-programmed computer with a touch-sensitive screen. A number of examples demonstrate that these screens were in use prior to the filing of claimed patent. First, the background section of the '877 Patent explicitly refers to the Gutterman patent, which contained a work station that included a touch sensitive display screen, and further recommended that "[s]uitable touch sensitive screens are made by Apple Computer." Gutterman col.7 ll.19-27, col.14 ll.39-43. Second, the CUBS workstation employed a touch-sensitive screen, and though not present on the programmed computer, its use certainly suggests that it would have been desirable on that device as well. January Gaspar Decl. Ex. 8 at CME 005317. Third, the PAR server screen (a booth computer) and the PAR workstations also employed touch-sensitive screens. Def. '877 Facts ¶¶ 178, 223, 248. The court finds ample support for its conclusion that the presence of such practices in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 14 would have been obvious to a person of ordinary skill and is therefore invalid.

Claim 15 requires the method in Claim 1 as well as the additional step of displaying substantially the same information on the display screens of the programmed computer and at least one of the two-way communication devices. In the paper system of communicating trading information described in the background section of the '877 Patent, we learn that the booth clerk

sent an instruction to a floor broker by handing the slip to a runner who took it from the booth to the broker. '877 Patent col.2 l.59-67. In turn, when the broker made a trade, the transcribed fill information would be sent on paper to the booth clerk by means of the runner. *Id.* col.2 ll.67 to col.3 l.4. In this way the broker and the booth clerk would view exactly the same information. Technological advances during the 1980s and 1990s allowed for the computerization of this paper-based method. For example, the CBOE computer systems, ORS, and PAR displayed substantially the same trade information on their respective screens. *See* Def. '877 Facts ¶¶ 218, 219-222, 224. Using either the PAR Order Display Screen or the PAR History Summary Display, the floor broker's display would show information on orders and executions including, but not limited to, whether the trade was a buy or a sell, the quantity of the trade, and price. Def. '877 Facts ¶¶ 216, 218. On the ORS side, the booth clerk could view all the trade information related to a specific order, such as whether the order was cancelled, modified, or filled, as well as quantity, and price. Def. '877 Facts ¶¶ 210, 220; January Gaspar Decl. Ex. 23 at CB 0320-21 (showing an order that is routed to a workstation, partially cancelled and then partially filled). The CBOE system was therefore capable of displaying some of the same information on the programmed computer and the broker workstation screens. Because a person of ordinary skill would likely develop a wireless two-way system in which the booth clerk and floor broker could view the same information about an order and the corresponding activity, a practice seen in both the traditional paper-slip method and in the CBOE system, the court finds that Claim 15 adds nothing new to the field of endeavor and is invalid for obviousness.

Claim 18 provides that prior to the selecting step in Claim 1 there be the additional step of constructing a further instruction by entering information at a touch sensitive input device connected to the programmed computer. As the prior art included devices with touch sensitive screens which were used for all kinds of reasons during the transaction and tracking of a trade, *see supra*, discussion on Claim 14, the court believes it would have been obvious to use these screens for any purpose that would efficiently complete the transmission – which would certainly include entering information for a further instruction prior to the selecting step. The presence of such technology in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 18 would have been obvious to a person of ordinary skill and is therefore invalid.

Claim 19 provides that at least some of the transmissions from the two-way communication devices are transmitted without manual intervention of the floor brokers. The court notes that the practice of automatic electronic communication between devices is a standard feature of any such system. The record demonstrates that the AUDIT handheld device performed this function. (Even though AUDIT did not receive orders from TOPS, it did communicate with a base station to execute certain trades. *See* discussion, *supra* note 11.) Specifically, AUDIT's transport layer "contain[ed] a Reliable Datagram Protocol which [made] sure that a request by the application to send or receive a file actually [was] accomplished without errors." May Gaspar Decl. Ex. 16 at CBOT 0283639. To accomplish this task, AUDIT employed an acknowledgment and retransmission scheme. *Id.* at CBOT 0283641. In this scheme, the programmed computer would "poll" all of the handheld addresses periodically "to see if any of

them have a pending message to send." *Id*. at CBOT 0283641. When a handheld had a message to send, it would encapsulate the data within a Reliable Datagram Protocol ("RDP") packet that included a "sequence" field. *Id*. at CBOT 0283645. The receiving RDP entity would then "generate an acknowledgment indicating which packet was received in an acknowledgment packet." *Id*. The record also shows that TOPS included the claimed feature. Indeed, the TOPS specification clearly states that (1)"[t]he member firm may elect to have the exchange system provide acknowledgment messages," (2) "[p]rotocol acknowledgments are automatically provided by the communication protocol," and (3) [m]essage acknowledgments, provided by the exchange system, indicate the successful validation of all fields of messages . . . ." January Gaspar Decl. Ex. 16 at CME 004127; *see also* Def. '002 Facts ¶ 63.1. The specification also states that if member firm messages do not pass validation, then the exchange system would return a rejection message to the member firm's system explaining the error. January Gaspar Decl. Ex. 16 at CME 004123. Accordingly, the court finds that the presence of such technology in the prior art, combined with the elements in the independent claim, adds nothing new to the field of endeavor; thus, Claim 19 would have been obvious to a person of ordinary skill and is therefore invalid.

Based on the above considerations, the court finds that Claims 2-19 of the '877 Patent are invalid for obviousness under § 103.

2. The '002 Patent

a. Independent Claim 1

Claim 1 of the '002 Patent claims a two-way wireless system for processing one or more executions against an order which is comprised of a local computer-readable memory that stores data accessed by an application program. '002 col.33 ll.26-29. This system requires that the data structure stored in a local computer-readable memory include a plurality of data packets, each of which contain a sequence code and a volley code as well as either order and execution information. *Id.* col.33 ll.30-36. The sequence code allows that application program to associate a subset of data packets from the overall plurality, while the volley code defines a hierarchical relationship among the data packets within a subset. *Id.* col.33 ll.36-39. The claim further specifies that within a particular subset, there is an order data packet with one hierarchical level, and at least one execution data packet that has another hierarchical level. The execution data packets have a many-to-one relationship with the order packet as well as their own uniquely assigned sequence number. *Id.* col.33 ll.40-49. The claim therefore has five key limitations – a sequence code, a volley code, a many-to-one relationship, a hierarchical relationship, and a stored data structure[35] – each of which the court will address individually.

i. The Sequence Code Limitation

The parties adopt opposing positions with regard to whether the prior art performs or suggests the use of sequence codes on the transmission of order and execution data packets. On

[35] Although the data structure limitation appears first in the claim, the court must determine whether the prior art performed or suggested the other limitations before it can ascertain whether the data structure stored the exact features of the other claimed elements.

one hand, Papyrus argues that the CME system lacked sequence codes capable of relating order and execution data packets, or that at minimum, there is an issue of material fact concerning the existence of such sequence codes in the CME system. Pl. '002 Invalidity Resp. 23. On the other hand, NYSE contends that the CME system used a unique sequence code[36] to relate orders with their corresponding executions. Def. '002 Invalidity Reply 20-26. The court agrees with NYSE.

Member firm's systems transmitted order messages to the CME via TOPS.[37] These messages were each labeled with a unique order sequence code[38] that was assigned by the member firm's system and which TOPS would adopt so as to ensure that members could perform maintenance and inquiries on TOPS screens. Def. '002 Facts ¶ 64; May Gaspar Decl. Ex. 9 at CME 004107. Once TOPS validated the information contained in the message to ensure proper formatting, it would then route the order to the appropriate workstation. *Id.* After the floor broker took action according to the instruction contained in the order, TOPS would transmit an execution message[39] back to the member firm which included a unique execution sequence

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[36] The [[ ]].

[37] Specifically, TOPS served as the computer-to-computer interface between an exchange's system and the member firm's order processing system. May Gaspar Decl. Ex. 9 at CME 004123.

[38] The [[ ]], which is typically a "[[ ]]." Def. '002 Facts ¶ 64.

[39] *E.g.*, an [[ ]].

code[40] that was assigned by TOPS *as well as* the member firm's original order sequence code.[41] *See, e.g.*, Def. '002 Facts ¶¶ 52, 60. The practice of coupling execution sequence codes with order sequence codes not only allowed for the tracking and accounting of executions messages, but also ensured that executions were directly linked with the particular order that prompted the actions recorded in the execution messages.

The CBOT's system also assigned sequence codes to the order and execution data packets. Indeed, a CBOT employee testified that it was possible to "look up fills based on fill ID" and to "look up orders based on order ID." Panek Dep. at 148. Crucially, the fill messages entered into the system were "always linked back to an order ID," meaning that "somewhere in that fill record there was a reference to the original order ID." *Id.*

Apart from the prior art, the record contains the patent prosecution history. During prosecution, the patent examiner explicitly stated that the limitations directed toward attaching a sequence number and performing an audit trail "are common in the communications art where it is necessary to track various 'important' messages to ensure that they are received or, if they are not, then enable the sender to track the message to where it was erroneously sent." January Gaspar Decl. Ex. 2 at NYSE 0087365, NYSE 0087368. This commentary, coupled with the use of sequence numbers in the TOPS prior art lead the court to conclude that it would have been

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[40] An exchange's execution sequence code consisted of [[ ]].

[41] The specification shows that the exchange's execution messages included a field called [[ ]]. May Gaspar Decl. Ex. 9 at CME 004172, 74, 76, 82-91. Crucially, in TOPS, the [[ ]] "is equal to the member firm system's identifier of an order from an earlier message," *i.e.*, the original order sequence code appearing in the [[ ]] field. Def. '002 Facts ¶ 64.

obvious to one of ordinary skill in the art to include a sequence number which would enable the tracking of messages.

ii. The Volley Code Limitation

During claim construction, the court defined the term "volley code" as "codes that define the present stage of a transaction *or* which reflect the progression of communications for a transaction." *Papyrus III*, 581 Fed. Supp. 2d at 541 (emphasis added). The record demonstrates that the prior art systems used volley codes which defined the present stage of a transaction.

The TOPS specification makes clear that TOPS transmitted messages between the member firms' systems and the CME system containing a field[42] which indicated the type of message that was being sent in the message header. Def. '002 Facts ¶¶ 42, 58. TOPS's use of volley codes is also evident from the TOPS Order History Display Screen, which displays the complete audit trail for orders meeting the search criteria entered by the user. Def. '002 Facts ¶ 68. Importantly, the volley code for each message in the audit trail appears on the screen, letting the user know the stage of the transaction, such as whether an order had been changed or filled. *Id.*

The CBOE system is another example of prior art that used volley codes to indicate the present stage of the transaction. Using the ORS Individual Order Inquiry Screen the booth clerk could view the executions related to a specific order. Def. '877 Facts ¶¶ 169, 210-11, 219-222. Each message contained codes designating whether the message was a routed order, a routed

[42] The [[ ]] field.

cancel request, a routed cancel or replace order, a cancelled report, or a fill report, among other potential actions. January Gaspar Decl. Ex. 23 at CB 0310-0314.

Finally, in AUDIT, each transmitted data packet included a header field denoting the type of message.[43] Def. '002 Facts ¶¶ 122, 125-126. Furthermore, the RDP protocol packets used by AUDIT's wireless transmission system also contained a field which allowed for volley codes to define the progression of the communication.[44] More particularly, these codes denoted the type of packet sent by the RDP protocol , such as a poll packet, or an acknowledgment, among other kinds of packets. Def. '002 Facts ¶ 113.

Based on the above evidence, the court finds that the prior art suggests the use of volley codes to track the present stage of a transaction or the progression of communications for a transaction.

iii. The Many-to-one Relationship Limitation

The record is also replete with evidence that the prior art allowed for floor brokers to perform multiple executions towards a single order. In TOPS, for example, the Fill Report Screen allowed a broker to "enter up to ten separate fill reports into TOPS for a single order at a

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[43] The [[ ]] field. Papyrus argues that this field did not reflect the progression of communications for a transaction because AUDIT did not receive orders from a base station and therefore only permitted two types of messages which could precede one another. Pl. '002 Invalidity Resp. 28. The court is not persuaded by Papyrus's contention. That the [[ ]] did not adequately reflect a progression of communication or present stage of the transaction was simply the result of AUDIT's ability to transmit CTI 1 trades only. However, it is highly likely that it would have been obvious to a person of ordinary skill that the volley code field could reflect a progression or stage as soon as AUDIT transmitted more types of messages, such as an order or a quote request.

[44] The [[ ]] field included the following types: [[ ]]. Def. '002 Facts ¶ 113.

time" and "support[ed] the entry of partial fills at multiple prices." Franks Decl. Ex. 119 at CBOT 0327134. In addition, the Order History Display screen displayed the complete audit trail for a particular order, and would group all the related transactions – such as fills and changes – with the appropriate order. Def. '002 Facts ¶ 68 (displaying an order grouped together with one fill and two change-order executions). Similarly, the ORS Individual Order Inquiry Display Screen displayed all the executions that corresponded with the inquiry criteria. Def. '002 Facts ¶¶ 210 (showing multiple partial fill executions for one order), 220 (showing cancel and fill executions). On the PAR broker workstation, the Activity Report would list all the activities performed on each order for a given broker. January Gaspar Decl. Ex. 20 at CB 1347 (depicting grouped messages with partial fills, changes, and "names later" reports grouped together with their corresponding order). From these screens it is clear that the prior art provided for the event of multiple executions resulting from a single order. Moreover, the prior art was also able to associate orders with their related executions and display them in appropriate groups for viewing by the booth clerk or floor broker.[45] The prior art was therefore capable of associating an order with its corresponding executions in a many-to-one relationship.

iv. The Data Structure Limitation

Having examined the differences between the prior art and the other limitations in Claim 1, the court may now determine whether the prior art performed or suggested the storage of the above elements in a data structure within the local computer-readable memory. To support its

[45] Even though it is not clear by what method ORS and PAR were able to accomplish this, it is evident the systems were nevertheless able to associate the orders and executions. With regard to TOPS, the court previously determined, *see* discussion *supra* Section III(C)(2)(a)(i), that TOPS did in fact use sequence numbers to relate orders and executions.

contention that the data structure limitation is obvious, NYSE relies primarily on the CME prior art, arguing that the system performed all of the claimed limitations except that of storing the volley code.[46] Def. '002 Invalidity Br. 15-17. Nevertheless, NYSE argues that it would have been obvious to store the volley code in the CME's database. Def. '002 Invalidity Br. 16.

Papyrus challenges NYSE's position, arguing that the record fails to demonstrate (1) what data structure or structures in TOPS stored order and execution information and (2) the particular arrangement of data in any data structure or structures in TOPS that stored order and execution information. According to Papyrus, the record indicates that "instead of storing order and execution information in data packets containing the required claim elements, TOPS employed various internal files to store order and execution information, each of which could store different data fields from a transmitted TOPS message." Pl. '002 Invalidity Resp. 12.

Papyrus's argument, however, sidesteps the question that is at the heart of the obviousness analysis. The central issue is whether a person of ordinary skill would have found the combination of claimed limitations obvious in light of the prior art. Here, this claim simply requires that the data structure contained in the local computer-readable memory store a plurality of data packets[47] containing order and execution information, as well as a sequence code and a volley code. '002 Patent col.33 ll.26-36. The ordinary meaning of the term "data structure" is a

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[46] Although NYSE alleges that the CME system *used* the [[ ]] field as a volley code, it admits that the system may not have stored the code in its transmitted form. Accordingly, for the purposes of its invalidity motion only, NYSE assumes that the volley code was not stored. Def. '002 Invalidity Br. 16.

[47] During claim construction, the court defined the term "data packet" as "data in binary form, including address and control elements." *Papyrus III*, 581 F. Supp. 2d at 542.

particular way of organizing data.[48] *See* THE OXFORD ENGLISH DICTIONARY 265 (2d ed. 1989) (defining "data structure" as the way data is organized in a computer); MCGRAW-HILL DICTIONARY OF ELECTRICAL & COMPUTER ENGINEERING 140 (6th ed. 2004) ("A collection of data components that are constructed in a regular and characteristic way."). That Claim 1 necessarily requires that the specified binary data be grouped into a single packet for transmission does not in and of itself require that the data be stored in the same manner as it is sent. Moreover, regardless of the manner in which the CME system actually stored the information contained in the transmitted messages, common sense would dictate that the simplest and most obvious method of storing the message would be to store the whole packet as it was transmitted. While the CME may have chosen to store the data contained in the message in an alternative manner, that does not render the claimed limitation non-obvious.

Further, the record contains evidence that the prior art did in fact store the elements claimed by the limitations of Claim 1. As previously noted, *see* discussion *supra* Section III(C)(2)(a)(i)-(ii), TOPS transmitted messages which contained both an order sequence code and volley code that connoted the status of the transaction. According to testimony given by Linker, the data contained in transmitted messages were stored in the TOPS database. Linker Dep. at 85-86. Further, TOPS had the ability to display order and execution information on the Order History Display screen, meaning that the system necessarily stored all transmitted messages, and that it would be unlikely that the application would have the ability to search through received

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[48] The court notes that Papyrus presented extrinsic evidence from a number of dictionaries, all of which suggested that the ordinary meaning of "data structure" is a particular way of organizing data. *See Papyrus III*, 581 F. Supp. 2d at 531.

messages without first storing them on the local computer-readable memory.[49] Indeed, the TOPS specification explains that the Order History Display screen would "provide[ ] the facility to view the activity pertaining to a TOPS order for the *entire time* that the order resides on the system and for [fourteen] days after the order has been cancelled, fill reported, or expired." Franks Decl. Ex. 119 at CBOT 0327164.

Even if TOPS did not actually store the components required by Claim 1, Taylor testified that the AUDIT handheld stored at least "the time stamps for the initiation of the trade, *any kind of modifications to the trade*, and also the trade information itself, which would be quantity, price, contract, opposite broker, [and the] opposite side of the trade." Def. '002 Facts ¶ 120 (emphasis added); *see* May Gaspar Decl. Ex. 9 at CME 004174 (showing an example of message modifying a trade).[50] Taylor further testified that the AUDIT system base station computers contained local-computer readable memories which stored "essentially the same information" as was stored in the handheld. Def. '002 Facts ¶ 121; *see id.* ¶¶ 101, 104. In light of the record evidence, the court finds that the prior art performed the data structure limitation by storing a plurality of data packets, with each containing order and execution information as well as a sequence code and a volley code, in a data structure within the local-computer readable memory.

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[49] The court notes that the same conclusion applies to ORS, which allowed the booth clerk to view all messages that met a particular search criteria. Def. '877 Facts ¶¶ 219-222.

[50] The [[ ]] message contained a volley code, the [[ ]], and an order sequence code called the [[ ]]. *See* May Gaspar Decl. Ex. 9 at CME 004165, CME 004174. The cited example therefore demonstrates that at least some of the messages stored by AUDIT contained the pertinent trade information as well as an order sequence code and volley code.

As the court previously noted, the obviousness analysis includes an inquiry as to "whether the improvement [taught by the claim] is *more than the predictable use* of prior art elements according to their established functions." *KSR* at 417 (emphasis added). Here, a person of ordinary skill in the art would have found it obvious to combine prior art elements like those embodied in TOPS and AUDIT, as well as the CBOT and CBOE systems, to develop a system like the one described in the '002 Patent. Papyrus was not the first to develop a device that utilized sequence codes capable of relating order and execution data packets (just as did TOPS and the CBOT system), or that utilized volley codes to define the present stage of a transaction (as in AUDIT and the CBOE system). In addition, TOPS and the CBOE system, like the claimed invention here, allowed the entry of multiple executions against a single order, and enabled the grouping of said multiple executions with the original order. To use and combine these techniques, which were already employed by systems in various financial exchanges at the time the '002 Patent was filed, yields no more than a predictable use or a predictable result that a person of ordinary skill would have foreseen. *See id*. at 416-17. Therefore, the court finds that Claim 1 is invalid for obviousness under § 103.

b. Independent Claim 8

Independent Claim 8 describes a two-way wireless system for processing executions against an order that is comprised of two computers, each with an application program that generates sequence codes and volley codes and a local computer-readable memory for storing data. '002 Patent col.34 ll.9-18. The claim then reads exactly like Claim 1, specifying that the computer-readable memories in each of the computers contain a data structure that stores a

plurality of data packets which are comprised of order or execution information as well as sequence codes and volley codes.[51] *Id.* col 34 ll.19-36. Finally, the claim requires that the system have a wireless communications link between the two computers which is selectively established to enable the transmission of messages. *Id.* col.34. ll.37-39. The court notes that Claim 8 does not present any limitation that has not been previously discussed herein, and which the court has not deemed invalid for obviousness. *See supra* Section III(C)(1)(b) (finding Claim 19 of the '877 Patent obvious in light of AUDIT's use of a two-way wireless system using a selectively established wireless communications link for the transmission of messages); *see* discussion *supra* Section III(C)(2)(a) (finding Claim 1of the '002 Patent invalid for obviousness). The court therefore need not revisit these issues.

c. Dependent Claims 2 and 9

As Claim 2 and Claim 9 are nearly identical, the court will discuss them together.[52] The two claims define a system having a processor programmed with the application, which is configured to compare data packets received from a remote computer to the plurality of data packets already stored in the local computer-readable memory. '002 Patent col.33 ll.49-53, col.34 ll.40-45. The record contains ample evidence that the comparison of data packets was practiced throughout the prior art. TOPS, for example, provided that re-transmitted messages

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[51] During claim construction, the court construed the data structure limitation in Claim 8 as requiring the two computer-readable memories to store the same data structure and to contain information that may be accessed by their respective computer. *Papyrus III*, 581 F. Supp. 2d at 541.

[52] The only difference between the two claims is that Claim 2 depends on Claim 1, while and Claim 9 depends on Claim 8.

were "not entered into the exchange system database if an earlier message with the same order sequence code[53] had already been entered into the database." Def. '002 Facts ¶¶ 43, 59, 64. To make this determination, the system necessarily had to compare the newly-received messages with those already in the database. In AUDIT, the RDP protocol[54] ensured that duplicate messages were not passed to the application for processing by comparing the sequence numbers of the messages it received. If the protocol received a duplicate message, it would simply acknowledge the message but not send the data therein to be processed. Def. '002 Facts ¶ 95. According to Mr. Knighton, the idea of comparing sequence numbers to distinguish among data packets was not unique to AUDIT, and the developers who created the RDP protocol "took inspiration from the analogous wire packet communication of the day." Def. '002 Facts ¶ 96. Finally, multi-player game technology also compared received data. The prior art practiced the comparison of data packets and this feature adds nothing patentable to the independent claims. Therefore, the court finds that Claim 2 and Claim 9 are obvious and therefore invalid.

d. Dependent Claims 3-5 and Claims 10-12

The content of Claims 3-5 and Claims 10-12 are substantially the same – but for the former's dependence on Claim 2 and the latter's dependence on Claim 8 – and will therefore be discussed together. Each group of Claims describes a system which compares data packets received from a remote computer to those already in the memory. On this foundation, Claims 3 and 10 require that said system store a newly-received data packet only if it has a hierarchical

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[53] Known as the [[ ]], *see supra* note 38.

[54] *See supra* Section III(C)(1)(b)(ii), (2)(a)(ii).

level greater than the highest level previously stored for the sequence code contained in the data packet. '002 Patent col.33 ll.54-58, col.34 ll.46-51. Claims 4 and 11 specify that a newly-received data packet is also stored if the sequence code is one not previously known in the local-computer readable memory. '002 Patent col.33 ll.59-62, col.34 ll.52-55. Finally, whenever the hierarchical level of the newly-received data packet is equal or less than the highest level previously stored for a particular sequence number, then Claims 5 and 12 dictate that the system discards the data packet. '002 Patent col.33 ll.63-67, col.34 ll.56-60. The court notes that the '002 Patent is not the first system to compare identifiers to determine whether the system's application utilizes a received message. Indeed, multi-player video game systems in the prior art employed such a technique. For example, Claim 1 of the Tashiro patent teaches the use of a data erasing protocol that uses running count data – which increases each time the game state data passes through a player's machine – to "*discriminat*[*e*] whether or not the running count data is *higher than a given reference level* at each time when data are transmitted to the one player's game machine, and for forcedly clearing the game state data if the running count data is higher than the reference level . . . ." Tashiro col.12 ll.3-9 (emphasis added). The court recognizes that the multi-player video game described in the Tashiro patent clearly employed the above process to achieve an end distinct from the subject matter in Claims 3-5 and 10-12 and therefore did not perform the claimed limitations. However, the court finds that the process of comparing running count data and discarding data according to the data's reference level strongly suggests that the practice of comparing a message's identifier (such as a sequence code) and discarding the message if its hierarchical level is equal to or less than the highest level already stored in a

computer memory. As a person of ordinary skill would likely have been familiar with multi-player game technology and because it is equally likely that said person would find it obvious to apply the techniques described in the Tashiro patent to the financial trading field, the court therefore finds that Claims 3-5 and Claims 10-12 add nothing patentable to the independent claims and are therefore invalid for obviousness.

e. Dependent Claims 6 and 13

Claim 6, describing a system like the one described in Claim 1, and Claim 13, which describes a system like the one described in Claim 8, specify that the application program compares order data packets with at least one execution data packet in the many-to-one relationship to determine the unfilled portion of the order. '002 Patent col.34 ll.1-5, 61-65. NYSE argues that it would have been obvious for the TOPS application to calculate leaves, *i.e.*, to identify the unfilled portion of a partially executed order, and to determine when an order was completely executed by comparing an order data packet to at least one corresponding execution data packet. Def. '002 Invalidity Br. 23. Papyrus simply contends that NYSE has presented no evidence that TOPS stored order and execution information according to the claims. Pl. '002 Invalidity Resp. 55. While the evidence in the record does not conclusively demonstrate that TOPS calculated a leaves quantity,[55] the PAR prior art performed the claimed limitations. Specifically, the PAR floor broker workstation calculates the leaves value and continuously

[55] Nevertheless, the TOPS specification does establish that execution data packets transmitted from TOPS to the member firms' systems contained the [[ ]] field, which was the "[q]uantity of an order, in contracts, remaining after a machine fill entry." Def. '002 Facts ¶ 64. The specification does not clearly explain the manner in which TOPS calculated the value in the field and its subsequent use in the system.

updates the workstation screen to display the unfilled quantity of each order. *See generally* January Gaspar Decl. Ex. 20. The Floor Broker Workstation Reference Guide shows that when the floor broker selected an order to be traded, the PAR Order Display Screen would display the quantity available for trading at the bottom of the order. January Gaspar Decl. Ex. 20 at CB 1330-31. Once the broker entered the amount to be traded, the system would calculate and display the leaves value next to the available quantity. *Id.* at CB 1331. The PAR system provided for partial fills, in that if the broker traded a quantity less than that which was available, "the remaining quantity on the order [would] stay active on the workstation after the trade had been made." *Id.* at CB 1333. The logical conclusion from this practice is that the system would then update the Order Display Screen and display the leaves value as the new available quantity. As the PAR prior art clearly practiced the claimed limitation, the court finds that Claims 6 and 13 add nothing patentable to the independent claims and are therefore invalid for obviousness.

f. Dependent Claim 7

Claim 7 specifies that the data structure described in the system of Claim 1 further includes a fill sequence number assigned by the application program stored in the local computer-readable memory to one or more execution data packets. NYSE argues that Claim 7 adds little if anything to the system in Claim 1. Def. '002 Invalidity Br. 24. Papyrus seeks to differentiate Claim 7 from Claim 1 by citing explanations in the preferred embodiment of the fill sequence number's purported uses. Pl. '002 Invalidity Resp. 56. The court agrees, however, with NYSE's observation that neither of the fill sequence number's purported functionalities are a requirement of any claim in the '002 Patent. Def. '002 Invalidity Reply 39; *Fuji Photo Film*

Co., Ltd. v. Int'l Trade Comm'n, 386 F.3d 1095, 1106 (Fed. Cir. 2004) (citation omitted) (''It is a familiar axiom of patent law . . . that the scope of a claim is not limited to the preferred embodiments described in the specification.''). In any case, the court has already examined the prior art and noted that TOPS assigned a unique sequence number to each execution data packet.[56] As there is at least one instance of prior art performing the claimed subject matter, the court finds that Claim 7 adds nothing patentable to the independent claims and is therefore invalid for obviousness.

D. Secondary Considerations

As part of its analysis, the court may also consider secondary considerations, such as long felt but unsolved needs, commercial success, and the failure of others. *KSR*, 550 U.S. at 406 (citation omitted). In this case, the patent specifications afford some insight into the needs of financial exchanges during the early 1990s. According to the background section in the '877 and '002 Patents, the prior art had failed to supply a "reliable system that [could] provide[ ] assurances that instructions are noticed, timely processed, and faithfully followed regardless of the location of the floor broker on the trading floor." '877 Patent col.5 ll.20-23. The specifications also highlight the financial exchanges' need for systems that could provide an audit trail for reconciling any unreconciled trades. *See id.* col.5 ll.23-25. Finally, the patents also emphasize the benefit of a system which would allow for the "monitoring of the activities of one or more floor brokers so that investors and commission houses can be apprised of progress on any particular instruction, throughout the trading day and without difficulty." *Id*. col.5 ll.27-30.

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[56] *See* discussion *supra* Section III(C)(2)(a)(i).

The record demonstrates that Papyrus was unable to achieve commercial success despite obtaining the two patents at issue here and developing a system that embodied the '002 Patent. Papyrus was unable to sell a license under either the '877 or the '002 Patent to any of the fifteen securities exchanges in operation during the early and mid-1990s.[57] Papyrus was also unable to sell its wireless two-way communications system to either the American Stock Exchange (AMEX) or the NYSE despite submitting proposals and participating in tests at each exchange.[58] Def. '002 Facts ¶¶ 190-194. Further, Papyrus has not offered any products or services for sale since 1995, the same year it "effectively terminated all employees and was 'moth balled'[ ] out of business . . . ." Def. '002 Facts ¶¶ 195-96.

With regard to the failure of others, Papyrus points to AUDIT as an example of how the technology for a "wireless handheld that could handle order information and allow a broker/trader to report a trade" was "out of reach" in 1993. Pl. '002 Invalidity Resp. 58. Despite that the CME spent a greater part of the 1990s developing AUDIT, the prototype never reached the production stage and the CME discontinued the project because of problems with implementation and performance, as well as a result of mixed broker perceptions regarding usability and functionality. Taylor Dep. at 79-80; *see* Franks Decl. Ex. 144 ("Hand-Held Projects at CBOT and CME") at NYSE 0027103. At the time the CME ceased developing its prototype,

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[57] Def. '877 Facts ¶¶ 274, 277, 280, 283, 286, 289, 292, 295, 298, 301, 304, 307, 310, 313, 316; Def. '002 Facts ¶¶ 199, 202, 205, 208, 211, 214, 217, 220, 223, 226, 229, 232, 235, 238, 241.

[58] Papyrus makes a distinction between the two tests, stating that it "tested" an "experimental wireless communication system" at the AMEX and "piloted" its wireless handheld system at the NYSE during an "initial pilot." Pl. '002 Statement of Material Facts ¶¶ 190, 192.

AUDIT was not capable of sending and receiving information fast enough to accommodate the real time nature of financial trading,[59] or receiving orders via an electronic interface. *See* Linker Dep. at 223; Taylor Dep. at 93-95; Huff Dep. at 127.

The court finds that the aforementioned record evidence weighs predominantly in favor of a finding of obviousness. While the need for effective communication of delegated instructions and for accurate audit trails has likely existed for as long as there has been trading on financial exchanges, the claimed patents were not the first inventions that sought to address those needs. Rather, the prior art is filled with devices and methods that could be used to improve or facilitate trading in financial exchanges. While Papyrus's system may have improved the efficiency or accuracy of trading, that result does not mean that its invention is sufficiently different from the prior art as to be patentable. Additionally, Papyrus's own lack of commercial success suggests, in part, that financial exchanges either deemed their own systems more effective in providing for the communication of delegated instructions and audit trails, or that the exchanges had other systems from which to choose that were better suited to their particular needs. Finally, the CME's AUDIT project was not the abysmal failure that Papyrus characterizes it to be. Rather, the AUDIT handheld devices were capable of transmitting trades made by local traders to a base

[59] Notably, Papyrus's wireless two-way communication system had similar problems with the transmission of data during the pilot test at the NYSE. *See* Franks Decl. Ex. 95 at NYSE 0027491, NYSE 0027501. [[

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station, a fact which demonstrates that the wireless handheld device was effective at transmitting some messages. Franks Decl. Ex. 131 at CME 003564; *CFTC Report* App. D at 20-21; Taylor Dep. at 37, 94-95. Thus, the secondary considerations do not change the court's conclusions above regarding the obviousness of the '877 and '002 Patents.

IV. Conclusion

Having considered the parties' motions and their copious submissions, and for the reasons contained herein, it is hereby:

ORDERED that NYSE's motion for summary judgment that all asserted claims of the '877 Patent are invalid is GRANTED;

ORDERED that NYSE's motion for summary judgment that all asserted claims of the '002 Patent are invalid is GRANTED;

ORDERED that NYSE's motion for summary judgment of non-infringement of the '877 and '002 Patents is DENIED; and it is further

ORDERED that Papyrus's motion for summary judgment of infringement of the '002 Patent is DENIED.

Dated: September 2, 2009
New York, NY

/s/ Judith M. Barzilay
Judith M. Barzilay, Judge